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THE PHARMACEUTICAL JOURNAL.

VOL. XII.—No. I.—JULY 1st, 1852.

THE ORIGIN AND PROGRESS OF THE PHARMACY BILL.

The Charter of the Pharmaceutical Society was never considered in any other light than as a precursory measure, which would place the Society in a recognized position, and pave the way for an Act of Parliament. Early in the year 1846 the Council turned their attention to the task of preparing the outlines of a Bill. As stated in this Journal (vol. v., page 481) the first plan which suggested itself was to make the Society the basis of the proposed enactment. "It appeared just and reasonable that those who had united and exerted themselves for the advancement of their profession and the benefit of the public, should be recognized as the founders of the new system, and invested with the requisite powers for carrying it into effect." But on further deliberation some difficulties arose, and it was thought desirable to place the body which was to be the subject of legislation on a broader basis than that of a Society comprising numerically a small proportion of the Chemists and Druggists of the kingdom, and combining functions which were thought to be incompatible with the extensive powers contemplated in the proposed Act. Accordingly, with a view of conciliating and including in the scheme the entire body of Chemists, and avoiding the semblance of a close corporation, it was proposed to establish a College of Pharmacy, to register as Members all Chemists already in business on their own account, and to vest in this College the functions of examination, retaining the Pharmaceutical Society for educational purposes. A Bill having this object was prepared, and discussed by the Council; the outline of the plan was submitted to the Members for consideration, and a deputation waited on the College of Physicians to confer upon the subject.

While this proposal was favourably received by the Chemists generally, it was not altogether satisfactory to the Members of the Society, who considered themselves entitled to some privileges or distinction as the founders of an improved system, and questioned the justice of admitting to an equal status those who had not united in the movement, and had contributed nothing towards the expenses of the Society. The result of the interview with the College of Physicians was not favourable to the establishment of a College of Pharmacy, and some doubt arose as to the practicability of maintaining two institutions, which would entail a double expense of rent, officers, &c.

Accordingly this plan was abandoned, and in the year 1847 the outline of a Bill was prepared, adopting the Pharmaceutical Society as the examining body, providing for the registration of all existing Chemists and Druggists, and prohibiting unregistered persons from carrying on the business or assuming the name or emblems of a Pharmaceutical Chemist. The broad and liberal basis of this proposed arrangement was open to the objection above referred to on the part of the Members, namely, that it would admit to equal rank with themselves those who had hitherto taken no part in the undertaking. This objection, however, was overruled, as it was obvious on a review of all the circumstances of the case, that some concession must be made, and that the public utility of the measure was a more important consideration than the personal or exclusive privileges of the founders of a Society professedly established with a public object. From time to time the provisions of the Bill were revised, re-considered, and amended, and all the endeavours of the Council to prevail on the Secretary of State to adopt the Bill, or even to enter upon the subject having failed, the Bill of last year was introduced to Parliament through a different channel.

It was soon ascertained that the exclusive powers sought to be obtained under the Bill, were not likely to be conceded by the House of Commons, that the proposal to prohibit all unqualified persons from carrying on the business was held to be a system of monopoly, incompatible with the principles of free trade, and therefore untenable. In accordance with this view of the case, the Bill of the present session was further modified, the words "carry on the business of a Pharmaceutical Chemist" were erased from the restricting clause, the penalty being made applicable only to the assumption by unregistered persons, of a name, sign, emblem, &c., implying qualification. The plan of general registration was retained, Assistants and Apprentices as well as Chemists in business on their own account, being entitled to be registered on the production of satisfactory certificates. Medical practitioners were exempted altogether from the operation of the Bill, in deference to the expressed wishes of those who had threatened to oppose it unless such proviso were introduced in clear and unequivocal terms. In this shape the Bill was submitted to the Select Committee of the House of Commons, thirty witnesses were examined, and after discussion of the principle of the Bill, and the objections urged by some of the witnesses, it was reduced to the form in which it has now been passed into an Act.

Instead of a measure providing for the registration of all Chemists and Druggists, and the examination of all who may in future assume a name, or title, &c., implying qualification in Pharmacy, it is reduced to an Act for confirming and amending the Charter of Incorporation, and conferring an honorary distinction on the Members of the Society. Opinions may differ in regard to the value and probable influence of the privilege thus bestowed by the Legislature on those who voluntarily submit to the conditions of membership. That it will raise the character of the Society, we think, no one can doubt. Those who are not Members may be disappointed at finding that they are excluded; for this they are themselves responsible, as they might have joined the Society if they had thought proper; and the remedy is in their own hands, as the provisions of the Charter respecting the admission of Members are still in force. While, therefore, we regret that the operation of the Act is less extended than we anticipated, we are not disposed to undervalue the advantage of legislative recognition, and the status which will be enjoyed by those who may think proper to come within the pale of its influence. The amount of benefit to be derived from the Act, and its effect in raising the qualifications of future Chemists, will now depend upon the judicious management of the Society and the extent to which it may be supported.

It is not improbable that the first impression of some of our readers will be that the Act in its present attenuated form will do neither good nor harm; that its provisions being permissive instead of compulsory, it will exert but little if any influence on the general body of Chemists. We may be met by the usual question, "*Cui bono?*" and requested to explain the advantage, if any, that will be derived from the assumption of the title Pharmaceutical Chemist, or the privilege of registration as a member of a voluntary Society. On the same principle it might be asked of what value is the diploma of the College of Surgeons? "*Cui bono?*" Why should any person take the trouble to study his profession and pass the examination? The law does not require it, the College has no Act of Parliament prohibiting unqualified persons from acting as Surgeons. Yet we find that every man who aspires to a respectable position as a Surgeon, becomes a Member or Fellow of the College. It is a necessary passport to public confidence and professional success. A man who assumes the title of Surgeon without possessing the diploma of the College, instead of gaining credit and respectability, degrades himself to the level of a quack, and the Charter of the College, although it confers no compulsory powers, has practically acquired almost as much weight as a compulsory Act. Under the

auspices of the College, Surgery has made great progress, and some of the most distinguished Surgeons in Europe have emanated from that body.

The Pharmacy Act, besides conferring an honorary distinction on those who are registered under it, vests in the Society the power of prosecuting those who fraudulently assume that distinction or pretend to be connected with the Society. This is a power not possessed by the College of Surgeons, or by any medical or surgical body in this country. The College of Physicians and the Society of Apothecaries can prosecute those who practice illegally, but the proof of illegal practice is attended with some difficulty, as patients are not disposed to embark in such prosecutions, and those who may be interested in suppressing illegal practice can only get up a case by means of a trap or conspiracy. But the illegal assumption of a name or title—the fraudulent exhibition of a pretended certificate—is a tangible offence, admitting of easy proof, and liable to summary punishment. The distinction between registered Pharmaceutical Chemists and unqualified persons, will be strictly maintained, and as soon as the value of this distinction is generally understood, the public will answer the question "*Cui bono?*" by patronizing those in whom they can place confidence.

The following is the

ACT FOR REGULATING THE QUALIFICATIONS OF PHARMACEUTICAL CHEMISTS.

WHEREAS it is expedient for the safety of the public that persons, exercising the business or calling of Pharmaceutical Chemists in Great Britain, should possess a competent practical knowledge of Pharmaceutical and general Chemistry and other branches of useful knowledge: And whereas certain persons, desirous of advancing Chemistry and Pharmacy, and of promoting an uniform system of educating those who should practise the same, formed themselves into a Society, called "The Pharmaceutical Society of Great Britain," which said Society was on the 18th day of February, 1843, incorporated by royal charter, whereby it was provided that the said Society should consist of Members who should be Chemists and Druggists, who were or had been established on their own account at the date of the said charter or who should have been examined in such manner as the Council of the said Society should deem proper, or who should have been certified to be duly qualified for admission, or who should be persons elected as superintendents by the Council of the said Society: And whereas it is expedient to prevent ignorant and incompetent persons from assuming the title of or pretending to be Pharmaceutical Chemists or Pharmaceutists in Great Britain, or Members of the said Pharmaceutical Society, and to that end it is desirable that all persons before assuming such title should be duly examined as to their skill and knowledge by competent persons, and that a register should be kept by some legally authorized officer of all such persons: And whereas for the purposes aforesaid, and for extending the benefits which have already resulted from the said Charter of Incorporation, it is desirable that additional powers should be granted for regulating the qualifications of persons who may carry on the business of Pharmaceutical Chemists: 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,

I. That the said Charter of Incorporation, granted to the said Society on the 18th day of February, 1843, save and except such part or parts thereof as are hereby altered, varied, or repealed, shall be and the same is hereby confirmed and declared to be in full force and virtue, and shall be as good and effectual to all intents and purposes as if this Act had not been passed.

II. The Council of the said Pharmaceutical Society shall be and the same are hereby authorized and empowered to alter and amend the bye-laws of the said Society, made and established under or in pursuance of the said Charter of Incorporation, and to make and establish such new or additional bye-laws as they shall deem proper and necessary for the purposes contemplated by the said charter or by this Act: provided always, that all such original bye-laws, and all altered, amended, or additional bye-laws, shall be confirmed and approved by a Special General Meeting of the Members of the said Pharmaceutical Society, and by one of her Majesty's

principal Secretaries of State: provided also, that the existing bye-laws of the said Society shall continue in force until the next Annual Meeting of the said Society, to be held in the month of May, 1853.

III. At all meetings of the said Society at which votes shall be given for the election of officers, all Members entitled to vote may give their votes either personally, or, in cases of residence exceeding five miles from the General Post-office, St. Martin's-le-Grand, London, by voting papers authorized by writing, in a form to be defined in the bye-laws of the said Society, or in a form to the like effect, such voting papers being transmitted under cover to the secretary not less than five clear days prior to the day on which the election is to take place.

IV. The Council of the said Pharmaceutical Society shall, within three calendar months after the passing of this Act, appoint a fit and proper person as a Registrar under this Act, and the Council of the said Society shall have the power to remove the said registrar, or any future registrar to be appointed under this Act, from the said office, and from time to time to appoint a new registrar in the room of any registrar who may die, or retire, or be removed from office as aforesaid, and also to appoint and remove from time to time a deputy registrar, and such clerks and other subordinate officers as may be requisite for carrying out the purposes of this Act, and also to pay suitable salaries to the said registrar, deputy registrar, clerks, and officers.

V. The registrar to be appointed under, or by virtue of this Act shall from time to time make out and maintain a complete register of all persons being Members of the said Society, and also of all persons being Associates and Apprentices or Students respectively, according to the terms of the Charter of Incorporation, and shall keep a proper index of the register, and all such other registers and books as may be required by the Council of the said Society, and may be necessary for giving effect to the bye-laws of the said Society, and to the provisions of this Act.

VI. All such persons as shall at the time of the passing of this Act be Members, Associates, Apprentices, or Students of the said Pharmaceutical Society of Great Britain, according to the terms of the said Charter of Incorporation, shall be registered as Pharmaceutical Chemists, Assistants, and Apprentices or Students respectively.

VII. The Registrar to be appointed under or by virtue of this Act shall be bound, on the application of any person paying one shilling, to certify under his hand whether or no any person whose name and address shall be furnished to him appears in the said register, or is a Member of the Pharmaceutical Society of Great Britain or not; and the certificate of such registrar, signed by the said registrar, and countersigned by the President or two Members of the Council of the said Society, shall, in the absence of evidence to the contrary, be sufficient evidence of the facts therein stated up to the date of the said certificate.

VIII. All such persons as shall from time to time be appointed under or in pursuance of the said Charter of Incorporation or the bye-laws thereof, or under this Act, shall be and the same are hereby declared to be fit and proper persons to conduct all such examinations as are provided for or contemplated by this Act, and shall respectively have full power and authority and are hereby authorized and empowered to examine all persons who shall present themselves for examination under the provisions of this Act in their knowledge of the Latin language, in Botany, in Materia Medica, and in Pharmaceutical and general Chemistry, and such other subjects as may from time to time be determined by any bye-law; provided always that such examinations shall not include the theory and practice of medicine, surgery, or midwifery; and the said examiners are hereby empowered to grant or refuse to such persons, as in their discretion may seem fit, certificates of competent skill and knowledge and qualification to exercise the business or calling of Pharmaceutical Chemists, or as the case may require, to be engaged or employed as Students, Apprentices, or Assistants respectively.

IX. And to enable the said Society to provide for the examination in Scotland of such Students, Apprentices, or Assistants in Scotland as may desire to be examined there, it shall be lawful for the Council of the Society, and they are hereby required, to appoint such fit and proper persons in Scotland, to meet in Edinburgh or Glasgow, or such other place or places as the Council may think desirable, and to conduct there all such examinations as are provided for and contemplated by this Act, with such and the like powers and authorities in respect thereof as are herein conferred, and to grant to the persons to be so examined such and the like certificates as are hereinbefore specified and referred to, or to refuse the same; and all the provisions

of this Act shall be equally applicable to the examiners, examinations, and parties examined in Scotland as to the examiners, examinations, and parties examined in England.

X. Every such person who shall have been examined by the persons appointed as aforesaid, and shall have obtained a certificate of qualification from them, shall be entitled to be registered by the registrar according to the provisions of this Act, upon payment of such fee or fees as shall be fixed by the bye-laws; and every such person duly registered as a Pharmaceutical Chemist shall be eligible to be elected as a Member of the said Society; and every such person duly registered as an Assistant shall be eligible for admission as an Associate of the said Society; and every such person duly registered as a Student or Apprentice to a Pharmaceutical Chemist shall be eligible for admission into the said Society, according to the bye-laws thereof.

XI. That no person who is a member of the medical profession, or who is practising under right of a degree of any university, or under a diploma or licence of a medical or surgical corporate body, shall be entitled to be registered under this Act; and if any registered Pharmaceutical Chemist shall obtain such diploma or licence, his name shall not be retained on the said register during the time that he is engaged in practice as aforesaid.

XII. From and after the passing of this Act, it shall not be lawful for any person, not being duly registered as a Pharmaceutical Chemist according to the provisions of this Act, to assume or use the title of Pharmaceutical Chemist or Pharmaceutist in any part of Great Britain, or to assume, use, or exhibit any name, title, or sign implying that he is registered under this Act, or that he is a member of the said Society; and if any person, not being duly registered under this Act, shall assume or use the title of Pharmaceutical Chemist or Pharmaceutist, or shall use, assume, or exhibit any name, title, or sign implying that he is a person registered under this Act, or that he is a Member of the said Society, every such person shall be liable to a penalty of five pounds; and such penalty may be recovered by the registrar to be appointed under this Act, in the name and by the authority of the Council of the said Society, in manner following (that is to say),

In England or Wales, by plaint under the provisions of any Act in force for the more easy recovery of small debts and demands:

In Scotland, by action before the Court of Session in ordinary form, or by summary action before the sheriff of the county, or in the royal burghs before the magistrates of the burghs where the offence may be committed or the offender resides, who, upon proof of the offence or offences, either by confession of the party offending, or by the oath or affirmation of one or more credible witnesses, shall convict the offender, and find him liable in the penalty or penalties aforesaid, as also in expenses; and it shall be lawful for the sheriff or magistrate, in pronouncing such judgment for the penalty or penalties and costs, to insert in such judgment a warrant, in the event of such penalty or penalties and costs not being paid, to levy and recover the amount of the same by poinding:

Provided always, that it shall be lawful to the sheriff or magistrate, in the event of his dismissing the action and assoilzieing the defender, to find the complainer liable in expenses; and any judgment so to be pronounced by the sheriff or magistrate in such summary application shall be final and conclusive, and not subject to review, by advocation, suspension, reduction, or otherwise.

XIII. Provided always, that no action or other proceeding for any offence under this Act shall be brought after the expiration of six months from the commission of such offence; and in every such action or proceeding, the party who shall prevail shall recover his full costs of suit or of such other proceedings.

XIV. All and every sums and sum of money which shall arise from any conviction and recovery of penalties for offences incurred under this Act, shall be paid as the Commissioners of her Majesty's Treasury shall direct.

XV. If any registrar under this Act shall wilfully make or cause to be made any falsification in any matters relating to any register or certificate aforesaid, every such offender shall be deemed guilty of a misdemeanor.

XVI. If any person shall wilfully procure by any false or fraudulent means a certificate purporting to be a certificate of registration under this Act, or shall fraudulently exhibit a certificate purporting to be a certificate of membership of the Pharmaceutical Society, every such person so offending shall be adjudged guilty of a misdemeanor.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

FIRST MEETING OF THE COUNCIL.
JUNE 24, 1852.

The following were elected to the respective offices of the Society for the next twelve months:—

Mr. Joseph Gifford .....PRESIDENT.
Mr. Henry Deane.....VICE-PRESIDENT.
Mr. Richard Hotham Pigeon .....TREASURER.

HONORARY MEMBERS OF THE SOCIETY.

Douglas Maclagan, M.D., F.R.S., Edinburgh, Lecturer on Materia Medica.
George Wilson, M.D., F.R.S., Edinburgh, Lecturer on Chemistry.

BOARD OF EXAMINERS IN SCOTLAND.

The Board of Examiners for Scotland will meet for Examination of Members, Associates, and Apprentices, in the Society's Rooms, 72, Princes Street, Edinburgh, on Wednesday, 7th July, at 11 o'clock, forenoon.

Parties desirous of presenting themselves, are requested to communicate their intention to the Secretary, 121, George Street, at least ten days prior to the days of meeting, and at the same time to transmit such testimonials or certificates as they may wish the Board to inspect.

Until further notice, meetings for Examination will be held four times a year, namely, on the first Wednesday of January, April, July, and October.

JOHN MACKAY, *Secretary.*

Edinburgh, June, 1852.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE CHEMICAL CONSTITUTION AND ATOMIC WEIGHT OF THE NEW POLARIZING CRYSTALS PRODUCED FROM QUININE.

BY WILLIAM BIRD HERAPATH, M.D.

In the April and May numbers of this Journal the author announced the discovery of a peculiar salt of quinine, which possessed the power of polarizing a ray of light with even greater intensity than the tourmaline, and at certain angles of rotation also depolarizing light, acting as selinite would do under similar circumstances. He then stated that the qualitative analysis showed this salt to be a compound of quinine, iodine, and sulphuric acid; and although the relative quantities of these constituents had not at that time been estimated, he gave it the name provisionally of iodide of disulphate of quinine. In the present communication the results of the quantitative chemical analysis of this compound will be detailed; and it will be evident that a new idea of its constitution will be elicited, which will render another name necessary, and more in accordance with the results specified. Before attempting the analysis it was of course necessary to invent a process which would furnish a large quantity of this substance at one operation. After several attempts, with more or less

success, the following method was adopted, which, at the same time, served as a means of corroborating the results of the future analysis, as it enabled the experimenter to account for all the iodine used in the operation.

A tubulated retort was adapted to a receiver by careful connections, and the latter adjusted to a second receiver somewhat in the manner of a Wolff's apparatus; the condensers were then surrounded by a freezing mixture of nitrate of potassa and hydrochlorate of ammonia.

Into the retort were placed 100 grains of pure disulphate of quinine, with three fluid ounces of acetic acid; two drachms of diluted sulphuric acid (containing about twelve grains dry acid). When this mixture had been raised to about 180° Fah., the alcoholic solution of iodine was gradually added through a bent glass funnel adapted to the tubule of the retort. In this manner thirty grains of iodine, dissolved in 1150 grains of alcohol were employed. The whole operation occupied about half an hour, during which period a reddish-brown coloured fluid distilled and collected in the receivers—about four fluid drachms in quantity. This of course was carefully set aside for examination. The whole was allowed to become cold, still in connection; an abundant crop of crystals formed in the retort, which, having been kept during twenty-four hours at a temperature of 40° Fah. to deposit, were collected on a filter, and washed several times with acetic acid at 40° Fah., which had been previously found to have little solvent power on this compound at that temperature. The crystals having been well washed were dissolved in boiling alcohol, sp. gr. .838, and, on cooling, they recrystallized; this operation being repeated, they were at length obtained pure from any admixture of disulphate of quinine. Having been drained on a filter and washed with cold spirit, they were dried at 90° Fah., and subsequently over sulphuric acid and weighed. By this operation 66.6 grains were obtained.

(*a*). The acid mother-liquid, together with the first washings, were then examined for iodine. Upon allowing a few drops to evaporate spontaneously on a slip of glass, polarizing crystals formed around the edge of the liquid, consequently the compound is slightly soluble in cold acetic acid and spirit. The acetic acid having been nearly neutralized by ammonia, nitrate of silver was dropped into the solution as long as any iodide of silver was deposited. This was then carefully collected on a filter, washed repeatedly with distilled water, then with ammonia to remove any chloride, again with distilled water; dried, ignited, and weighed gave 2.00 grains, equal iodine 1.08 grains.

(*b*). The alcoholic mother-liquids and washings were then examined for iodine; crystals were similarly obtained upon spontaneous evaporation. In order to precipitate the iodine a solution of argento-chloride of ammonia was used, and dropped into the fluid as long as any cloudiness was produced; the whole thrown on a filter and the precipitated iodide of silver washed with diluted nitric acid to remove any quinine, and subsequently with ammonia to take up any chloride, then again with distilled water; dried, ignited, and weighed gave 3.63 grains, equal iodine 1.951.

(*c*). It now remained to examine the distilled liquids for iodine; as it existed in these in the free state, dissolved in alcohol they were mixed together and a little water added, and placed in a counterpoised flask with metallic zinc. After prolonged digestion, the iodine was converted into iodide of zinc—the fluids were then distilled off and the iodide of zinc dried at 212°, and weighed 3.35 grains=iodine 2.6715 grains.

Now if any substitution compound had been formed by the action of the iodine on the quinine, it was probable that hydriodic ether would have been produced, if so it would be found in the distilled fluid. This was carefully examined for this substance, but none detected; subsequent experiments shewed that none could have been produced, or if any, so small in quantity that its presence would be immaterial, for all the iodine used, with the exception of 2.56 grains, can be accounted for, thus:—

21.7375 grains iodine in the 66.6 grains of crystals. (Calculated at 32.63 per cent., as found subsequently).

1.0800 " iodine in the acetic mother liquid (crystals). (*a*).
1.9510 " iodine in the alcoholic mother liquid (ditto). (*b*).
2.6715 " iodine in the distilled fluid as free. (*c*).

27.44
2.56 grains iodine lost and unaccounted for.

Had a substitution compound been formed, one-half the iodine should have formed hydriodic acid; the other half should have been in the crystalline compound, as the substitution base; therefore, it is evident that no such substitution base can be the result.

One other question arises—Does the iodine exist in the green crystals as hydriodic acid?

Some of the crystals were dissolved in *diluted* alcohol (boiling) and starch added to the hot liquid; instantly an abundant precipitation of the blue iodide of amidine occurred; starch was added in excess, and until no further indications of iodine were evident; the colourless fluid was then separated by decantation and tested with nitrate of silver: not the least trace of hydriodic acid, or any soluble iodide was apparent. Similar results were obtained when the crystals were dissolved in hot acetic acid and tested with starch. It is evident, therefore, that no hydriodic acid is present in the crystals; and consequently that the iodine cannot exist in the compound as a substitution base, or even as hydriodic acid.

The iodine separating so readily in the free state, upon dissolving the crystals in alcohol, or in acetic acid, rendered it a somewhat difficult matter to estimate it correctly: starch was first used as the precipitant: the resulting iodide of amidine decomposed by sulphuretted hydrogen, the hydriodic acid produced, neutralized by ammonia, this precipitated by nitrate of silver, and the resultant iodide of silver estimated; but accuracy was far from being obtained by this method in consequence of iodine subliming during the solution of the crystals.

(*a*) At length it was found that by passing a current of washed and pure sulphuretted hydrogen through acetic acid, in which a known quantity of crystals had been placed; and applying heat to the mixture upon the gas being evolved the iodine was converted into hydriodic acid as soon as it was liberated from the crystals. The decomposition being perfect and the operation finished, the excess of sulphuretted hydrogen was expelled by boiling; testing with acetate of lead paper from time to time during this part of the process; the precipitated sulphur removed by filtering, washing well with distilled water, and to the filtrate adding ammonia nearly to neutralization, but short of precipitsting the quinine; then boiling the solution and precipitating the iodine by nitrate of silver; collecting on a filter, washing with distilled water, then with diluted nitric acid (to remove any quinine which falls with iodide of silver even from an acid solution) drying it and fusing by ignition in a platina capsule. 25 grains of crystals gave by this method 15.14 grains of iodide of silver = 8.1523 grains of iodine=32.6092 per cent.

(*β*). The solution after the separation of iodine was then, together with the washings, treated with acetate of baryta, until no further deposition of sulphate occurred; it was boiled to hasten the separation, filtered, washed, dried, and ignited, weighed 7.76 grains=2 653 SO_3=sulphuric acid 10.612 per cent.

(*γ*). The liquid after the separation of iodine and the sulphuric acid, was then acted on first by sulphate of ammonia, to remove excess of baryta, then with hydrochlorate of ammonia to remove the excess of silver.

(Δ). To this fluid concentrated by evaporation to about three fluid ounces, was added ammonia in excess; an immediate deposition of alkaloid was the consequence; ether was now added in sufficient quantity to dissolve the alkaloid, the supernatant etherial fluid was decanted into a counterpoised flask,

the operation being repeated as often as necessary, the mixed etherial fluids distilled, and the residuary alkaloid dried at 212° gave 7.533 grains.

(*ε*). The aqueous and ammoniacal solution upon evaporation to dryness in a water-bath and again treating the residue with ether as long as necessary, and distilling as before, furnished a second quantity of the alkaloid, which dried at 212° as before, weighed 3.14 grains.

Then 7.533+3.14=10.673 alkaloid equal to 42.692 per cent.

This analysis, therefore, accounts for—

Iodine	32.6092
Sulphuric acid	10.6120
Alkaloid	42.6920
	85.9132
The loss	14.0868, was possibly

water of crystallization; but it now became necessary to perform an analysis to make this point certain. After several attempts, the following process was adopted, and furnished correct results.

Having arranged an apparatus for preparing a current of *dry* hydrogen gas, the stream was passed through a flask containing iron filings. These were then heated red hot; the organic matters were reduced to pure carbon; the oxide of iron was reduced to the metallic state; when the gas issuing from the exit-tube of the apparatus burnt with a steady yellow flame, the operation was discontinued, at least the spirit-lamp was removed, and the iron allowed to cool, still in an atmosphere of dry hydrogen gas, and when cold, removed and well secured in a small stoppered bottle.

To the same apparatus for generating the dry hydrogen was adapted a counterpoised test-tube (a), and to the exit-pipe from this was connected a tube (b) containing chloride of calcium. This tube with its contents being also accurately counterpoised.

Into the tube (a) was placed a mixture of 10.2 grs. of the crystals (previously dried at 212°) rubbed up in a mortar with fifty grains of the purified iron-filings; the mortar was wiped out carefully with twenty grains of the same iron, and this also inserted into the tube carefully; a layer of pure iron-filings was placed over the whole, and the tube with its contents and fittings accurately counterpoised.

This part of the apparatus was then placed in a flask containing a solution of chloride of zinc, destined to act as a bath; a thermometer was also inserted in it; the whole apparatus having been satisfactorily adjusted, heat was now applied to the bath, and gradually raised to 370° Fah.; at this point it was necessary to remove the thermometer, as its scale did not extend any higher: the heat was continued until the chloride of zinc ceased to give off any water, and of course fused. This must have been about 420° Fah. or more.

In this operation the crystals were decomposed, the iron seized the iodine as fast as it was liberated; the quinine retained the sulphuric acid; the current of dry hydrogen gas carried off the aqueous vapour to the chloride of calcium tube, where it was retained; the increase in weight was 1.44 grains; thus, as 10.2 : 1.44 :: 100 : 14.1764 grains of water per cent.

This method was also adopted as a means of estimating the iodine, but for this purpose, the chloride of zinc bath was not employed, as a more perfect decomposition was then necessary. 10 grains having been thus treated, the mass in the test tube (*a*) was lixiviated repeatedly, as long as any iodide of iron was dissolved; this was at once filtered into a solution of nitrate of silver, iron filings being kept in the filter to avoid decomposition. The filter was repeatedly washed with boiling distilled water, and of course the washings were added to the previous liquid; the resulting mixture of iodide of silver and the oxides of iron were thrown on a filter and washed with hot diluted hydrochloric acid as long as any iron was removed; then with ammonia to remove any chloride, and afterwards again with distilled water; dried, ignited, and weighed, 6.00 grains

=iodine 3.1453 and 31.453 grains per cent., a result corresponding very closely with that previously obtained.

A second analysis specially directed to the estimation of the sulphuric acid, gave 10.844 per cent. as the result. Therefore we now have :—

	(α)	(β)	Calculated.		
Iodine	32.6092	31.453	124	32.63	1 atom
Sulphuric acid	10.6120	10.844	40	10.52	1 atom
Alkaloid	42.6920	—	162	42.63	1 atom
Water	14.1764	—	54	14.2152	6 atoms
	100.0896		380	99.9952	

These results correspond closely with the formula $(C_{20}\,H_{11}\,NO_2 + I) + SO_3 + 6\,HO$, and as it has been previously proved that the base is not a substitution compound, it only remains to consider it a salt in which iodine is super-added to the base quinine without interfering with its basic properties, however much it might alter its chemical characters.

Experiments have been instituted to produce this iodo-quinine in an isolated state, but hitherto without success; the nearest approach hitherto made is by the action of ammonia at 60° Fahr., by carefully triturating the polarizing crystals in the strongest liquor ammoniæ during half an hour, separating on a filter, washing with cold distilled water, carefully drying the reddish-yellow mass produced. This contained *nearly* all the iodine and quinine; but the ammoniacal solution contained sulphate of ammonia, with some of the resinous compound dissolved in it, together with about 11.0 per cent. of hydriodate of ammonia.

The resinous mass was treated with diluted sulphuric acid, in order to reproduce the polarizing crystals; they certainly were formed, but not in a satisfactory manner; some other compounds were also procured, the formation of which cannot be accounted for in the present condition of the question. The alkaloid separated by the previously detailed analysis was examined; from it was first made the disulphate; this differed materially from disulphate of quinine, both in its crystalline form and its solubility. It would dissolve in about three times its weight of water, at 212°, crystallizing in radiating plumose tufts, very similar to acetate of morphia in appearance. From this disulphate were reproduced the polarizing crystals very readily upon submitting it to the same operation as was originally used, namely, solution in acetic acid, and adding a spirituous solution of iodine to the heated fluid; on cooling, the green crystals deposited having their original extraordinary properties. The disulphate of the alkaloid differed as much in its optical as in its chemical characters from quinine; assimilating itself in the former to the disulphate of quinidine (β quinine), whereas the pure alkaloid much more resembled quinine in its chemical characters, as it is soluble both in alcohol and ether, but crystallizes from neither with facility. Some slight appearance of crystallization is obtained by exposing an alcoholic solution to spontaneous evaporation in a test-tube; around the edge of the liquid a thin radiating plumose crop is produced, being more distinctly acicular than the disulphate. It is, therefore, not quinidine (β quinine), but is similar probably to that variety of quinine recently called (γ) quinine by J. Van Heijnesigen (*Pharmaceutical Journal*, Jan., 1850) a mono-hydrate of the organic radicle $C_{20}\,H_{11}\,N\,O_2$, of which (α) quinine is the tri-hydrate, and (β) quinine or quinidine the bi-hydrate.

However, further researches are necessary to establish this point; for the present we are justified from the re-production of the polarising crystals from the alkaloid separated from the green polarizing compound by analysis, in considering that the alkaloid quinine enters into the composition of the crystals, but in the character of an iodo-base, but *not* a substitution base as has been already shewn, but a compound analogous in its constitution to iodo-codeine, di-cyano-codeine, cyaniline, cyano-toluidine, and cyano-cumidine, all of which are compounds not belonging to the series of substitution products. This, if correct, is a remarkable circumstance, and worthy of verification by a more elaborate investigation.

Since the publication of my last communication, I have succeeded in making an artificial tourmaline large enough to surmount the eye-piece of the microscope; so that at the present moment I am perfectly independent of the tourmaline, or Nichol's prism, in all my experiments upon polarized light; and the brilliancy of the colours is much more intense with the artificial crystals than when employing the natural tourmaline: as an analyser above the eye-piece it offers some advantages over the Nichol's prism employed in the same position, for it gives a perfectly uniform tint of colour over a much more extensive field than can be had with the prism.

32, *Old Market Street, Bristol, June* 11, 1852.

EXAMINATION OF PAVON'S COLLECTION OF PERUVIAN BARKS CONTAINED IN THE BRITISH MUSEUM.

BY JOHN ELIOT HOWARD, ESQ.

(*Continued from Vol. XI., page* 564.)

No. 3. *Cinchona scrobiculata* (Weddell).

I do not find the bark of this species in the collection, and should have passed it over if I had not copied Goebel's proposed derivation of the *modern Loxa*, or rather the "HO" crown bark from this tree. Having since inspected the authentic specimens of *scrobiculata* bark brought by Dr. Weddell (now in the Museum at Paris), I am satisfied that this idea is incorrect. I do not remember to have seen in commerce any *quill* bark corresponding to these specimens, and the only examples I have met with are that called *Quinquina de Loxa rouge-marron*, in the collection of M. Guibourt, identified by him (and I think correctly so) with the young bark of this tree brought home by Dr. Weddell, and one I have just discovered in the possession of the Pharmaceutical Society.

I will not dwell, therefore, on this species, nor on the C. amygdalifolia, but proceed to

No. 5. *Cinchona nitida* (Weddell.)

Cinchona nitida,† is found under No. *66 of the barks marked "*Cinchona nitida Fl. Peruv. es buena, del Peru.*" The specimen in the collection of Pavon is commercial "grey bark," of fine quality, differing widely from that of any of the varieties of Condaminea. It is not quite so *dense*, but is more *resinous*, the outer coat is more even, and does not present the varieties of surface observed in the latter bark. The peridermis, on the whole, adherent; but where it separates from the derm it peels off *in flakes*, and leaves exposed a brown indented surface. The internal surface is yellowish red, approaching to the colour of cinnamon. It is not without reason that the nitida is classed by Guibourt among red barks, under No. xi., *Quinquina rouge de Lima*. The

† C. NITIDA, *Fl. Per.*

Vulgo, *Cascarillo fino*, et *Quino fino*.

This cinchona reaches a height of thirty to forty-five feet and above. The trunk is mostly single, but sometimes two or three grow from one root, which separate from each other as they ascend, or have alike a horizontal direction. But if there is only one stem it rises perpendicularly aleft. Its thickness is from one and a half to five and a half feet. It bears many upright branches, which produce very thick boughs. The ramifications do not include many leafy twigs, but some trees are thickly clothed with leaves. The branches are strong as the stem, upright, and full of other small boughs, which have at the end four rather convex sides. The bark of the stem is very fleshy, the outer coat exfoliated, and of a dark grey colour. The bark of the thick boughs has a rough superficies, but is not so knotty as that of the stem, and varies from dark colour to dark grey, ash grey, and light. The bark of the tender branches is *very little rough*, and has *a clear grey colour*.

colour of the substance of the bark verges (more or less) on the reddish tint, and the difficulty which has been remarked in the isolation of the alkaloids of commercial red bark is found also to exist in this species. M. Guibourt says,‡ that, by an analysis which he was not able to complete, he found this bark very rich in cinchonine and in quinine. My own observations confirm this view of the subject, as I have obtained (notwithstanding the difficulty referred to) about .571 quinine, .142 quinidine crystallized, and 1.4 cinchonine—total, 2.113 per cent. The quinine, however, is in a state which renders it difficult (if not impossible) to crystallize in salts, and this circumstance presents a point of contrast to the species (C. Condaminea) with which this tree has been identified by some observers.

M. Guibourt identifies the *Cinchona nitida* of the Museum with his *rouge de Lima*, as mentioned above, and I fully agree with this, after examination of both specimens. It would appear that the commendation "*es buena*" ("it is good"), bestowed by Pavon, is well deserved, as Guibourt says that he finds this species of *cinchona*, which Ruiz and Pavon have placed in the first rank of usefulness, to be indeed eminently active.

M. Laubert gives a description under the designation No. iii. *La Peruviana*, which very correctly points out this bark, and is, in every particular, applicable, even as to the agreeable taste and pleasant smell (about which features observers seem apt to disagree); but it appears from a note in the *Bull. de Pharm.*, ii., p. 296, that this species was scarcely to be found in commerce. One would conclude the same as to France from M. Guibourt's remarks. It is not the same in England, however, for this sort, the *Quina cana legitima*,§ or "*Genuine grey bark*" of Laubert still keeps its ground in public estimation, and forms the finest samples in the drug market. I found it, in a recent sale, in the following proportion:—Thirty chests *C. nitida*, unmixed; 100 chests mixed with *C. micrantha*; and from thirty to forty chests almost all *micrantha*. All this sold as "grey bark," but the *nitida* was reckoned the finest.

The species called by Ruiz and Pavon *hoja de Oliva*, which has been thought to be identical with this, must surely be different, as the leaf of the olive is entirely unlike that of the *C. nitida* in the specimens of Pavon. Moreover, in the Quinologia the barks of the two sorts are described separately. The description in the Quinologia, is, however, not unlike that of "grey bark," especially as to the remarkable "gum-resinous sap," which exudes freely in the part which has been sliced by the knife in paring the bark from the tree. Perhaps the *hoja de Oliva* was a simple variety of C. nitida.

The specimen of "China Huanuco," in the Pharmaceutical Society's Collection A, No. 2, from M. Von Bergen, agrees (except a *few* pieces of *micrantha*) with this species, and perhaps his No. 6 and 12 of plate ii. are taken from the same. The rest are either badly executed or from poor specimens.

Omitting No. 6 (Weddell), C. Australis, and No. 7, C. Boliviana, I arrive at

No. 8. *Cinchona micrantha* (Weddell).

Dr. Lindley says, "I have seen only two certain specimens of this very distinct and well marked species; one in the Lambertian Herbarium, and one in my own, gathered in Peru by Matthews. There is in the former collection a *second specimen* from Pavon, marked C. micrantha, with obovata leaves, and a small compact thyrse of flowers, but it is too imperfect to be determined satisfactorily."‖

I have, through the kindness of Dr. Weddell, specimens of both his varieties, *α. rotundifolia* and *β. oblongifolia*, of which the former seems to correspond with the *second specimen* described by Lindley, and the others mentioned by him with *var. β oblongifolia* (Weddell).

Dr. Lindley says of the leaves, that they are oblong obtuse, or hardly acute,

‡ *Histoire Drogues*, iii., p. 121.
‖ *Flora Medica*, p. 413.
§ *B. de Ph.*, ii., 293.

rather membranous, very large, often a span long without the petiole," &c. My specimen of *a rotundifolia* has a leaf more than twelve inches long, without the petiole, and nine inches and a half in width. The size is said to vary according to the place of growth.¶

A sample scion of bark was sent over from Peru, a portion of which I forwarded to Dr. Weddell, who pronounced it to correspond with the *a rotundifolia*, which is the *C. cordifolia* of Rohde, and it is remarkable that the bark has also considerable similarity of appearance with that of *C. cordifolia*, both the tree and the bark, are, however, entirely distinct from this species.

The specimen of *β oblongifolia* has a certain general resemblance to that of *C. scrobiculata var. Delondriana* (Weddell), and with this it has been confused; but no two descriptions of bark can be more distinct than those belonging to these two trees, as specimens brought by Dr. Weddell clearly show.

There seems, however, to be a considerable variety in the products obtained from this species, and it is not very easy to know where to draw the line as to its varieties. In the *Flora Peruviana*, the discovery of the species is ascribed to Tafalla, in the year 1797, at St. Anthony de Playa Grande. In the collection, *Chicoplaya* is named, a place only a few miles distant.

M. Laubert says,** under "No. iv., *quinquina resembling the calisaya*," "M. Tafalla has sent from Peru some specimens of *a new quinquina* (a). Under this denomination and under that of *cascarilla provinciana* (b), he collected this bark in the woods of Chicoplaya. The same species also occurs in the mountains of Monzon, which belong to the province of Huamalies, and the discovery of it (c) is to be ascribed to M. Bezares. This bark *has a perfect resemblance to the orange-coloured quinquina of Mutis*, and Messrs. Zea and Mutis are rather inclined to believe that they may belong to the small species.

It is said that M. Bezares discovered at Monzon this species of calisaya (c); it is also said that he discovered at Monzon a quinquina similar to the calisaya (d), and which is thought to be of the same species with the red quinquina of Mutis. It is possible that the discovery of the calisaya, which is ascribed to Bezares, the question may be only on the discovery of this new quinquina resembling the calisaya, which, according to M. Ruiz, is very different from the calisaya, as well as from the orange-coloured quinquina of Mutis. This doubt can be cleared up only by the arrival of the specimens which M. Tafalla is to send.

Afterwards, at p. 89, we find a short notice amongst the quinquinas recently discovered by Tafalla, of the C. micrantha, as No. iv. "*Fine cascarilla of Chicoplaya, de flor pequena (with small flowers.*") (b) "The specimens," it is said, "arrived with those of the former species, but without the bark. This new species is much esteemed where it grows." "It attains the height of twenty-five yards, and grows in the Andes of Peru on the side of Chicoplaya." It is ascribed to C. micrantha, *Flor. Peruv.*

We have here, apparently, *four* sorts of barks assembled under one head, but possessing more or less of different features. Of these we may perhaps identify

First sort, or Sort (a).

C. species nova parecida a la naranjada de Mutis.—This is No. *63 of Pavon's collection. It differs the most from the other specimens: it is in heavy solid quills, with the silvery *periderm* common to *micrantha* barks, which exfoliates, and discloses a *derm* purplish, smooth, and *cracked in drying*. Some of the pieces are *fibrous*; and this circumstance, together with a certain resemblance in the colour and coat, probably gave rise to the mistaken idea of its resembling the *naranjada bark* of Mutis.

¶ Folia-ovalia, nonnulla ovali-obovata, integerrima obtusa, obsolete acuminata, amplæ patentia, plana, *ufpluriumus quadripalmaria*, &c., of the *Fl. Peruv.*
** Lambert *Illust.*, p. 73.

Second sort, or Sort (b).

No. 17 *Cinchona Provinciana, vulgo de Loxa.* This is No. xxxii. on wood, the bark on which has a silvery appearance. The bark is No. *50, and inscribed *Quina Provinciana species nova de Loxa*, it is marked by Guibourt "Q. gris de Lima ou q.q. Huanuco. It is *coarse*, that is, *inferior*, Huanuco bark. It is a heavy bark, in pieces ten inches long, some cut like C. nitida, with gum-resinous juice exuding; some with longitudinal wrinkles, some with distant cross cracks, and longitudinal cracks; substance pale brown.

Another specimen is from Jaen.

No. 17. "*Quina provinciana de Jaen de Loxa*," marked by Guibourt, "Q. de Lima." It is, like the other, *inferior Huanuco bark*.

No. 43. *C. Cascarilla provinciana fina de Jaen de Loxa.*—This is No. xviii on the wood, having a silver-coated bark. The bark not in the collection.

No. 88. *C. quina provinciana de Jaen, Loxa.* M. Guibourt has written on this *Q. Gris de Lima*, 479, 480, *Hist. Dr.*, 3nce ed. Dr. Pereira considers it "Huanuco bark."† It is curled in drying, like Jaen bark, has a *green-skinned derm, a periderm which easily exfoliates*, with longitudinal wrinkles, feeble cross cracks, some warts, and other *fungoid excrescences*, the quills curl in upon themselves. M. Guibourt in his 4me ed., vol. iii., p. 110, says it is the same as his No. 34 *fine grey Lima*, but a little larger.

It appears to me to be the same as the sort of *pata de gallinazo* which was gathered by Poeppig, in the cinchona woods of Cuchero in 1829, and of which the Pharmaceutical Society possesses a specimen. It perhaps still more exactly resembles the *cascarilla provinciana* from the Cinchona forest of Cuchero, gathered by the same traveller.** I have seen the *same* sort of bark, under the same name, *Provinciana*, which was received only a few weeks since by Dr. Weddell from Peru. The *pata de gallinazo*, according to Poeppig,†† is from the younger and upper branches of the Cinchona micrantha, R. & P., and the Cascarilla provinciana is from the larger boughs.

Third sort, or Sort (c).

No. *23. *C. quina parecida a la amarilla de Mutis, descubierta por Tafalla en Chicoplaya, en Peru.*

This is *inferior Huanuco bark*, and corresponds with the species mixed with the bark of C. nitida in the sale of 22d April, *ult.* This again resembles the *cascarilla provinciana*, both of Pavon and of Poeppig, and also the *pata de gallinazo* of Poeppig.

The botanical specimen in Pavon's herbarium, marked "*Cinchona micrantha sp. nova edita, Flor. Peruv. in Peru*," agrees entirely, so far as I could judge, with a specimen given me by Dr. Weddell of *β oblongifolia*. The barks differs much, but this is remarked by Poeppig, as regards the varieties which fell under his observations, though of course he did not see those of Bolivia. Poeppig says, respecting the *cascarilla provinciana Cinchona micrantha* R. and P. of *Cuchero*—"This tree differs from that which grows near Huanuco by *a remarkable whitish colour and a greater roughness of the upper surface*. It is more *thick* and *woody*, the *fracture is more fibrous*, and the colour *clear cinnamon brown*. This was probably the sort found both at Chocoplaya and Monzon, places near together, and much nearer to Cuchero than to Huanuco.

Fourth sort, or Sort (d).

The bark discovered by Bezares is said to be *similar to the calisaya*. I do not know any specimens of this apparently "*red*" kind (Weddell's "Histoire," p. 53), as discovered by him; but it is a curious fact that whilst the C. micrantha furnished in Peru the second rate qualities of *grey bark*, in Bolivia the same tree produces second rate varieties of *calisaya*, which pass in commerce as light and flimsy sorts of Bolivian bark. I have no doubt of the entire identity of the species in these two cases, as shewn in the specimens before described, and also to be traced in the bark itself, notwithstanding the difference produced by the circumstances under which it is grown.

The influence of soil and climate on the vegetations of the cinchonæ, and consequently on their production of alkaloids, is a point requiring further investigation. In every species I have yet studied this appears to be *very great*.

The produce of the *inferior grey bark* I have mentioned was in alkaloids as follows:—Quinine .243, quinidine .28, cinchonine 1.25. Total 1.773 per cent.

General Remarks on Grey Barks.—Before leaving the subject of the grey barks I will add a few observations as to the points of distinction between the barks of the *C. nitida* and the *C. micrantha*, a distinction more important in a botanical than in a pharmaceutical point of view, as both may be classed among the more efficacious sorts.

1. The *substance* of grey bark of the first quality being procured from C. nitida, is, as observed in the Quinologia "*very fleshy*," and thus contrasts with that of micrantha, which always partakes more or less of the *woody* character, verging on the *finely fibrous*. This is sufficiently evident in its fracture, but becomes still more apparent under the microscope, when the *nitida* will be seen to approach the No. 30, or calisaya structure of Dr. Weddell, and the micrantha the No. 32, or scrobiculata, structure.

2. The thickness of the bark of the *nitida* in reference to the bough on which it grows is much greater than that of *micrantha*. The fine specimen C. nitida in the British Museum, marked No. 36 on the wood, has a diameter of about 3½ inches, and the thickness of the bark is more than two lines, whilst the specimen

† The appellation "*Huanuco bark*" is one liable to some uncertainty. According to Laubert,‡ "the *quinquina* to which this name was given was known in Spain for the first time in 1799, as brought by the frigate *La Velox*, which landed at Santander 180 chests. M. Ruiz, who was deputed to examine this parcel, found in the chests a thick bark, till then unknown to the botanists of Peru, mixed with the barks of C. nitida and of C. lancœolata, and with those of the species which Tafalla has described under the title, *similar to the Calisaya*. * * The later shipments were less carefully selected, for M. Ruiz found a quantity of barks of still less value than the preceding."

M. Laubert then describes "the thick bark, *particularly designated under the name of Huanuco*," which appears to be the sort which is called by Pavon *parecida a la naranjada de Mutis*, the "*woody variety of grey Lima*," according to Guibourt, and evidently the produce of *C. micrantha, R. & P.*

This derivation is fully confirmed by Poeppig, the well-known naturalist, by whom the region was explored, which supplies the barks shipped from the port of *Lima*, and which in some countries are named from this place, whilst in others they are called *Huanuco barks*. It is, according to this traveller,§ a very mountainous district, broken by numerous ravines; the *Quebrada* of Cassapi (of which he gives a plate), furnishing us with a good idea of the whole. Poeppig tells us that the rich cinchona barks are only to be met with on lofty elevations; but there must be exceptions to this rule. In the Part *Geographic et Physique* of Humboldt's travels there is a plate which is called "*Esquisse hypsometrique des Navads de Montagnes et des ramifications de la Cordillere des Andes*," which much elucidates the subject of the bark districts. There I find the next group (*Navad*) of mountains south of Loxa to be that "of Huanuco and of Pasco," connected of course with the other by the intervening Cordillera. It is on this group, with its branches, that the *Lima* barks are produced, about six degrees south of Loxa and four degrees north of the next group, marked by Humboldt that "of Cuzco." It cannot be supposed that the Cinchonæ do not grow on the intermediate ridges; but according to Poeppig the barks procured between Huanuco and Loxa, as grown at a less elevation, are very inferior in quality. He adduces, as an example, the bark grown at Jaen, which has acquired a specially bad reputation, also those of Mayobamba, Chacapoyas and Lamas, belonging to this intervening district. It was at Chicoplaya, north of Huanuco, that the C. micrantha was first discovered by Tafalla (See No. 23 *inscription*), and this tree and the *nitida* seems to give the prevailing character to the barks of the Huanuco district, as the *Condaminea* characterize the Loxa group, and the varieties of *scrobiculata* the district of Cuzco.

‡ B. de Ph. II., 399. § Reise II., 257. (His journey occupied from 1827 to 1832.)

** These form No. 90 and 91 of the Pharm. Society's collection. The Museum at Paris possesses a similar specimen from Poeppig.

†† Vol. ii., p. 261.

of micrantha, or *provinciana fina*, on a diameter of 2½ inches has not more than the thickness of half a line of bark. In consequence probably of this circumstance the *micrantha* wrinkles longitudinally much more in drying than the *nitida*.

3. The external colour of the derm of the *nitida* varies from maroon colour to that of rust, and that of the periderm (where not covered with lichens) is brown of deeper or lighter shade; the superficial colour of the *micrantha* is as to its prevailing hue glaucous green, and this observation has reference both to the derm and epiderm. The substance of the bark may be considered *red* in the nitida, and *rusty yellow* ("d'un jaune orangé clair et grisâtre," Weddell) in the micrantha. In some species of this latter bark the tone is much richer and deeper, but still different from that of the nitida. In the Bolivian micrantha the bark, according to Dr. Weddell, takes, as soon as it is stripped from the tree, a bright blood red colour, and in fact it is not difficult to trace a peculiarly persistent colouring matter in the examination of both the Peruvian and Bolivian kinds of micrantha.

4. The appellation *grey* refers in both these species to the striking effect of the overspreading *thallus* of various graphideæ, &c., forming sometimes very pretty groups when carefully examined. It is scarcely needful to say that this circumstance shows nothing as to the kind or quality of the bark, further than as an indication that the tree has grown in an open situation exposed to rain and sunshine.§§ Other kinds are occasionally quite as much adorned with this bright clothing, especially the calisaya quill, and Goebel has figured together, in plate vii, the quill of grey bark (*C. nitida*) and that of China regia (apparently *Calisaya pallida*) as thus resembling each other.

5. The characteristic appearance of the outer coat of the C. micrantha (which however varies much) is attempted to be given by the same writer under plate vi., fig. 6—8, as Lima or Huanuco barks, and this contrasted with plate vii. above referred to, is the only available representation I can refer to for illustration of this point.

The *resinous character* of the bark of C. nitida appears to be described in the *Quinologia* among the characteristics of the finest bark, as follows:—"The gum-resinous sap must be found in abundance inspissated between the outer coat and the bark, and show itself on the fracture of the bark, forming a somewhat dark circle in which (as Bergius says) may be seen some shining points when it is held against the sun." This distinct resinous circle is connected with the constitution of the bark, as indicated by various chemical re-agents, which, so far as I have made experiments, concur in showing that it is rich in all the usual constituents of the *sap* of the cinchonæ, whilst the predominant feature is the abundance of tannin. This must, I conclude, be of importance in a medicinal point of view. The simple decoction of the two barks presents a remarkable point of contrast, for whilst the decoction of the *nitida* is *brown*, becomes speedily troubled, and deposits an abundant sediment on cooling, that of the *micrantha* is *pale yellow*, remains clear for a time, and then gives a small and *flocculent* deposit. The predominant feature of the *micrantha* is to be found in its general woody texture, a feature which is very noticeable in reducing it to powder, whilst the only *hard* portion of the *nitida* is its resinous circle. I cannot but suppose the "fine grey" bark (the *nitida* bark) would act much more powerfully on the human system than the inferior grey (the produce of *C. micrantha*), but no *corresponding* or at least no *adequate* distinction appears to be made in commerce.

(To be continued.)

§§ Quinologia, under C. officinalis.

"These trees grow on the high mountains, where it is cold at night, but sunny and mild by day, and where also other different trees, shrubs, and smaller plants cover the rocks and cliffs. They like a *free air, cold, water, and sunshine*. Shady and close situations are injurious to the full perfection of the bark."

ON YELLOW BARK.

BY ROBERT SCHWARTZ.

Yellow bark (Königs-Chinarinde), which is said to be obtained from *Cinchona lancifolia*, Mutis*, contains two bases, viz., cinchonine and quinine, and three acids, kinic, cincho-tannic, and kinovic acids. It owes its peculiar reddish-yellow colour to red cinchonic, a product of the decomposition of the cincho-tannic acid. Cinchonine and quinine, as well as kinic acid, have often been analyzed, but nothing is at present known respecting the composition of cincho-tannic acid and red cinchonic.

When the bruised bark is boiled with water, the above-mentioned substances may be detected in the watery extract. By repeatedly boiling with water, the kinic and cincho-tannic acids can be completely removed from the bark, but of the red cinchonic and of the kinovic acid, the greater proportion remains undissolved in it.

When the bark, after being exhausted with water, is boiled with diluted milk of lime, it yields all the kinovic acid contained in it, but retains the red cinchonic. When, however, the bark previously exhausted by water is treated with spirit of wine mixed with muriatic acid, the whole of the kinovic acid is dissolved, whilst the red cinchonic, liberated from its combinations by the muriatic acid, dissolves in the spirit of wine, which acquires thereby a deep-red colour.

Kinovic acid is contained only in a small proportion in the aqueous decoction of the bark, the greater portion being retained by the latter, which shows that the greater portion at least of the kinovic acid is contained in the bark in a free state, as it is almost entirely insoluble in water. By boiling the bark, deprived of all soluble substances, by diluted milk of lime, and filtering the decoction, a yellowish liquid is obtained, which, upon the addition of muriatic acid, lets fall an abundant precipitate of kinovic acid in the form of gelatinous flakes. In this way, a quantity of kinovic acid is obtained from the genuine cinchona barks, which is as large as that obtained by the same method from the bark of *cinchona nova*.

In order to obtain the kinovic acid in a pure state, its calcareous salt, dissolved in water, is treated with animal charcoal, and the decolourized filtered liquid decomposed by muriatic acid. The gelatinous precipitate is treated with water as long as wash-water is rendered cloudy by a solution of nitrate of silver. The acid dried at 212° F., was analyzed, and yielded:

Carbon	68.90 . . .	68.80 . . .	12 = 72 . . .	68.57
Hydrogen	8.85 . . .	8.87 . . .	9 = 9 . . .	8.57
Oxygen	22.25 . . .	22.33 . . .	3 = 24 . . .	22.86
	100.00	100.00	105	100.00

All the properties of this substance, and also its composition, sufficiently prove the identity of this bitter matter with kinovic acid or the so-called kinova bitter, which exists ready formed in the bark, and can be artificially obtained from caincic acid (from the bark of the root of *Chiococca racemosa*). The statements of Winckler with regard to the presence of kinovic acid in the genuine cinchona barks are thus corroborated.

Cincho-tannic acid.—Berzelius was the first who tried to obtain this acid in a pure state. The author has repeated these experiments, and found it advisable no to employ magnesia: the properties of the acid he found to be exactly the same as mentioned by Berzelius. The greatest difficulty in examining this acid, is offered by its tendency to absorb oxygen, so that it is scarcely possible to obtain an acid which has not absorbed a certain quantity of this element.

There exists hardly any substance which so readily combines with the oxygen of the air, as the tannic acid of cinchona barks. This tendency is possessed in a still higher degree by the compounds of tannic acid with alkalies and alkaline earths, in a moist state, so that the alkaline cincho-tannates might be employed for eudiometrical experiments, like pyrogallic acid. The cincho-tannic acid is contained in the bark in small quantities only; the author was obliged to employ forty-eight pounds of the bark to obtain a quantity of acid sufficient for his experiments.

The bruised bark was boiled with water, the decoction strained through linen, and mixed with a small quantity of magnesia, which took up some of the red

* This is a mistake; yellow bark is the produce of *Cinchona Calisaya* (Weddell).—Ed. Ph. J.

cinchonic and became brownish-red. The filtered liquid, treated with acetate of lead, yielded an abundant brownish-red precipitate, which was decomposed under water by sulphuretted hydrogen. From the liquid filtered from the sulphuret of lead, tribasic acetate of lead threw down a brownish-red substance, which was partially soluble in acetic acid. By this method kinovic acid and a small quantity of red cinchonic remain behind with the sulphuret of lead. The greater portion of the red cinchonic, combined with a small quantity of oxide of lead, remains undissolved by the acetic acid. The acetic solution, if treated with ammonia, yields a beautiful light-yellow precipitate, which was washed with water and decomposed by a current of sulphuretted hydrogen. The liquid, filtered from the sulphuret of lead, which is now perfectly free from gum, was deprived of sulphuretted hydrogen by a small quantity of an alcoholic solution of sugar of lead, and filtered to get rid of sulphuret of lead.

By a further addition of an alcoholic solution of sugar of lead, a light-yellow precipitate is formed, which was separated by filtration, treated with alcohol, and placed in a vacuum over sulphuric acid. In order to prevent oxidization by some atmospheric air, which might possibly have remained behind, a paste-like mixture of protosulphate of iron and hydrate of potash was placed into the receiver. The analysis of this salt showed:—

Carbon	55.70	28	= 168	55.81
Hydrogen ...	4.60	13	= 13	4.31
Oxygen	39.70	15	= 120	39.88
	100.00		301	100.00

The formula for this salt of lead is pretty nearly $C_{28}\,H_{13}\,O_{15}+3\,Pb\,O$, which may be considered as composed of $(C_{14}\,H_6\,O_7, 2\,Pb\,O)+(C_{14}\,H_7\,O_7, Pb\,O\,HO)$.

Supposing the oxide of lead in this salt to be replaced by equivalent quantities of water, the formula of the hydrate of the cincho-tannic acid would be $C_{14}\,H_6\,O_7+2\,HO=C_{14}\,H_7\,O_9$.

In order to obtain the hydrate of the cincho-tannic acid, pure cincho-tannate of lead is decomposed under water by sulphuretted hydrogen. The liquid filtered from the sulphuret of lead was allowed to evaporate over sulphuric acid, near a moistened mixture of protosulphate of iron and hydrate of potash, after which an inflated, brittle, yellow, strongly hygroscopic substance remained behind, which became electric on friction, and had an astringent acidulous taste. As will be seen from analysis, the acid had imbibed a certain quantity of oxygen during the short time it was in contact with the air, while the sulphuric acid in the receiver was being renewed, whilst another portion of it remained in an unaltered condition:—

Carbon	44.75	42	= 252	44.84
Hydrogen ...	5.49	30	= 30	5.33
Oxygen	49.76	35	= 280	49.83
	100.00		862	100.00

The formula $C_{42}\,H_{30}\,O_{35}$ can be reduced to $2\,(C_{14}\,H_{10}\,O_{12})+C_{14}\,H_{10}\,O_{11}$. Two-thirds of the tannic acid have accordingly imbibed oxygen, whilst one-third has remained unaltered. The formula $C_{14}\,H_{10}\,O_{11}$ is $=C_{14}\,H_6\,O_7+2\,HO+2$ aq. These last two equivalents of water, which could not be removed from the hydrate of the cincho-tannic acid in the vacuum, were tried to be expelled by heating the acid at 212° Fah. in a current of carbonic acid gas. The deep-red colour which the substance assumed, showed that decomposition had taken place, which was further proved by the fact, that this acid, when brought in contact with water, was but partially soluble, and remained behind in the shape of a reddish-brown resinous mass. If an aqueous solution of cincho-tannic acid be mixed with sulphuric acid, a precipitate appears, as was observed by Berzelius. If a concentrated aqueous solution of the acid be mixed with a small quantity of muriatic acid, and heated to the boiling point, the tannic acid is completely decomposed, and beautiful red flakes are formed, which dissolve in alkaline liquids with a leek-green colour.

Subjected to dry distillation the cincho-tannic acid evolves a very slight odour of carbolic acid.—The distillates diluted with water, produces all those reactions by which R. Wagner characterises phenylic acid, a diluted solution of perchloride of iron produces a green colour without any precipitate, and on the addition of ammonia this changes into red. This aqueous solution also absorbs oxygen with great avidity from the air, on the addition of an alkali.

If it should be proved by additional experiments, that by the dry distillation of cincho-tannic acid, phenylic acid is actually generated, it would indicate a close relation between the constitution of this acid and kinovic acid, which latter acid yields, according to Wöhler, besides other products, carbolic acid. A combination of pure cincho-tannic acid with oxide of lead, dried in a vacuum at 212° Fah., gave the following numbers:

Carbon	47.92	12	= 72	47.67
Hydrogen ...	4.85	7	= 7	4.63
Oxygen	47.23	9	= 72	47.70
	100.00		151	100.00

An aqueous solution of pure cincho-tannic acid exposed to the air, became turbid on the addition of water, and a reddish-brown substance was precipitated, which, washed with water and dried at 212° Fah., had the following composition:

Carbon	55.35	36	= 216	55.38
Hydrogen ...	5.68	22	= 22	5.64
Oxygen	38.97	19	= 152	38.98
	100.00		390	100.00

The formula $C_{36}\,H_{22}\,O_{19}$ can be reduced to $3\,(C_{12}\,H_7\,O_8)+H\,O$. By the addition of sulphuric acid to the aqueous solution after filtration from the substance described above, a reddish precipitate was thrown down, very similar to the former, and which dissolved readily in alcohol, but much less so in water. It consisted of:

Carbon.....	38.87	12	= 72	38.91
Hydrogen ...	4.81	9	= 9	4.86
Oxygen	56.32	13	=104	56.23
	100.00		185	100.00

This substance may be regarded as a hydrate, $C_{12}\,H_7\,O_8=C_{12}\,H_7\,O_{11}+2\,HO$. According to this view there existed three compounds, which contained for 7 equivs. of carbon and 7 equivs. of hydrogen, 6.9, and 11 equivs. of oxygen.

$3\,(C_{12}\,H_7\,O_8)+HO.$
$C_{12}\,H_7\,O_8$
$C_{12}\,H_7\,O_{11}+2\,HO.$

If the composition of hydrate of cincho-tannic acid be expressed by the formula $C_{14}\,H_6\,O_9$, and the formula of that product of oxidation containing the least proportion of oxygen$=C_{12}\,H_7\,O_{11}$ be deducted from this, the formula of the anhydrous formic acid $C_2\,H\,O_2$ is left. If, therefore, two equivs. of oxygen are added to the equiv. of cincho-tannic acid, the latter forms 1 equiv. water, 2 equivs. carbonic acid, and 1 equiv. oxygen in the above-described substance, $C_{12}\,H_7\,O_8$, which by further addition of oxygen may form $C_{12}\,H_7\,O_{11}$. The generation of carbonic acid simultaneously with red cinchonic has been already proved by Berzelius.

Red Cinchonic, or *Cinchona Red.*—Powdered cinchona bark, deprived by boiling of all substances soluble in water, was exhausted by diluted ammonia; and the intensely reddish-brown liquid let fall, when treated with an excess of muriatic acid, kinovic acid and red cinchonic in the shape of voluminous reddish-brown flakes. These were collected on a filter, washed with water, and boiled with diluted milk of lime; the red cinchonic forms thus with the lime a combination, insoluble in water, whilst the kinovate of lime is dissolved by water. The compound of red cinchonic with lime washed with water was heated with diluted muriatic acid, placed upon a filter, and washed with water, till the filtered liquid was no longer clouded by nitrate of silver. The red cinchonic, which had thus been freed from lime, was re-dissolved in diluted ammonia and precipitated by muriatic acid, perfectly exhausted with water, dissolved in spirit of wine, and the liquid filtered from the flakes, and evaporated in the water-bath to dryness. The red cinchonic thus obtained formed a chocolate-brown mass, nearly insoluble in water, which dissolved with greatest facility in alcohol, ether, and alkalies, with an intensely red colour. Dried at 212° F., the analytical result was:—

Carbon . . .	53.63	12=72	53.33
Hydrogen . .	5.36	7= 7	5.19
Oxygen . . .	41.01	7=56	41.48
	100	135	100.00

The cincho-tannic acid ($C_{18}H_8O_8$) must absorb 3 eq. of oxygen in order to be able to form 1 eq. of this red cinchonic, 2 eq. carbonic acid, and 1 eq. of water. When a solution of cincho-tannic acid, mixed with a few drops of liquid ammonia, is brought in contact with atmospheric air in a glass-tube, the volume of the air is rapidly lessened by the absorption of oxygen. When the absorption has ceased, carbonic acid gas is developed upon the application of a few drops of sulphuric acid, which, with regard to the volume, amounts to much less than the quantity of the absorbed oxygen; at the same time flakes of a reddish-brown substance, enclosing red cinchonic, separate from the liquid. The tendency of the tannic acid, when combined with a base, to absorb oxygen, is the reason why so small a proportion of cincho-tannic acid is contained in bark, whilst that of the red cinchonic is much larger; and even of this small quantity a large portion is lost by its being changed into red cinchonic during the preparation, which requires a number of operations in order to remove all other substances. All these experiments were performed in the laboratory of Prof. Roehleder.—*Central Blatt.*, 1852, No. xiii., p. 194.

DESCRIPTION OF THE GENUINE QUINA-TREE OF LOXA.

(*Cinchona officinalis*, now called *Condaminea*).

BY J. J. CALDAS.

The genuine quina of Loxa is a tree of from ten to sixteen Spanish ells (five to eight fathoms) high. The trunk is seldom single, two or three or more commonly growing from the same root. In the first case the trunk is quite perpendicular, in the latter case it is somewhat inclined horizontally, circular, about one-half ell in diameter, and the accessory trunks from four to eight inches in diameter.

The upper surface of the bark is very variable. According to age, temperature, and locality, it varies from a *light brownish* colour to *black*. If the trunk and the branches are much exposed to the sun and wind, the bark becomes black, and if the tree is closely surrounded by other trees, it assumes a brownish colour, which varies to a light yellowish grey. A large quantity of lichens grow on the whole of the surface. On the epidermis, whatever its colour may be, annular impressions or furrows are always perceptible, although sometimes but slightly impressed. They are the traces of the places where the stipules were situated. Immediately beneath each ring are two almost circular cicatrices, formed by the petiole after the fall of the leaves. Between the rings many other transverse furrows and cracks, varying in length, depth, and distance from each other, are perceived mostly parallel to the rings, but never extending entirely round the trunk. All these characteristics of the surface are also found on other species of *Cinchona*, and are, therefore, insufficient by themselves to distinguish any species. On the inner smooth surface, which is formed of fine, parallel, longitudinal fibres, we perceive numerous whitish spots, some of which are shining, but most of them dull. The colour of this surface is similar to that of dry cinnamon, passing rather into yellow when the bark is fresh. The edges of the fractured surface of the bark are sharp, like glass, and only here and there a small point is perceptible on the inner edge. Under a magnifier the epidermis appears attached [*gebunden*], blackish, and shining; the subjacent parenchyma, which forms a concentric ring, is thicker than the epidermis, sometimes blackish, sometimes brownish-yellow with many shining spots. Next follow the layers formed of parallel fibres, between which we observe shining points, which proceed from the gummy resinous juice diffused through the entire bark.

The branches are at the lower part terete, towards the extremities quadrangular, compressed, with two longitudinal furrows opposite the insertion of the leaves, covered with a white very short tomentum, standing crosswise, perpendicular, rarely horizontal. They divide into others, which are arranged in like manner, with a reddish bark.

The crown of the tree is oval and very leafy. The leaves are opposite, between oblong and lanceolate, quite entire, the circumference undulating, anteriorly somewhat contracted, and terminating in an obtuse point; flat, shining on both surfaces, beautifully green on the upper surface, somewhat pale on the under one; the nerve and veins rose-coloured. The leaves at the ends of the branches four to eight inches long, two to four broad. When young and delicate they are covered on the under surface with a short delicate down; when full grown they are of a bright red colour. The petiole is terete, above somewhat flattened, reddish, shining, one to two inches long, at the bottom slightly thickened and running down in the form of two distinct crests, by which two opposite furrows are formed which extend to the next leaves below. In the axils of the veins with the nerves the leaves have, on their under surface, a gland or porus, covered with a very short tomentum, similar to that of the coffee-leaf, or of *Cedrela odorata*. On the upper surface of the leaves we observe, at the spot where the glands are, small convexities. The stipules are opposite, between the leaves, ovate with a point, externally tomentose, internally smooth, shining, deciduous, pale green when young, at the margin rolled backwards and reddish; when full grown half-an-inch long, 4‴—5‴ broad, towards the top fixed to the leaf-stalk and forming the ring on the branch described above. They are covered with a viscid and resinous juice. At the inner part of the base we perceive many small knobs which resemble the warts on the tongue and the palate of many quadrupeds. The stipules cover the leaves completely before their development, and supply thus the scales of a scaly bud. They always protect the two upper leaves, being regularly inserted higher than the leaf-stalk.

The inflorescence consists of single and terminal racemes. The manner in which this *Cinchona* flowers has been differently described by various authors, and deserves, therefore, more strict attention. The peduncle terminates the branches. It is firstly divided into three, the middle and stronger proceeds straight, and forming the axis of the whole inflorescence. The lateral branches are smaller, obliquely erect, and repeatedly tripartite, till they branch off into the smallest, which support the flowers. The axis ramifies in a similar manner. The pedicels stand always crossways on their common pedunculus. From these circumstances I consider that the term *Corymb* is not applicable, and that Willdenow's description implies the true idea of this inflorescence: *Paniculà terminalis patens trichotomà*. The peduncle and pedicels are quadrangular, with obtuse angles, compressed with two furrows, reddish and covered with a very short whitish tomentum. The floral leaves, which are on the first, second, third, and also on the fourth division of the chief peduncle, agree in consistence, form, and tomentum, with the other leaves; they are opposite stalked, and above become gradually smaller. On all the other divisions and subdivisions of the inflorescence are acute bracts, which are opposite, half embrace their axis, are tomentose, internally shining, becoming smaller upwards, persistent till the fruit is perfect and then falling off, when the latter dehisces and disseminates the seed. One, sometimes two, deciduous, subulate, scaly, bractlets, very short, and of the same consistence as the bracts, are at the base of each flower. The monosepalous, superior, campanulate, very small, tomentose calyx is divided into five acute straight teeth. The corolla is monopetalous and salver-shaped; the tube cylindrical, a little constricted towards the top, imperceptibly curved, with five longitudinal furrows, corresponding to the sinuses between the segments of the limb, much larger than the calyx, externally deep rose-coloured, with a short white tomentum, internally of a beautiful rose colour and without hairs: the limb flat, extended, with five oblong lanceolate segments, much shorter than the tube: the segments of the same colour as the tube, and covered with tomentum on the outer side; internally of the same colour as the inside of the tube, and not tomentose, but at the margin woolly, ciliated. The apex of the segment more tomentose than the rest of the margin. The colour of this tomentum is white. The filaments are five, and subulate; inserted below the middle of the tube. From thence they extend to the bottom of the corolla, corresponding to the furrows of the tube and to the sinuses between the segments. They are shorter than the tube. The anthers are linear, straight, somewhat divided at the bottom, hardly projecting with their points above the throat, two-celled, with yellow pollen, attached to the filament a short distance from the base. The pistil beneath the calyx, short tomentose, with an obovate ovary. The style is filiform; the two linear obtuse stigmata approaching one another. The fruit is an oblong capsule crowned by the calyx, compressed with two longitudinal furrows, two valves, and two cells. The dissepiment is formed by the union of the inner margins of the valves, by which the fruit becomes, as it were, divisable into two capsules. It dehisces longitudinally, and at the separation of the margins of the valves the seed and the seminal receptacle are expelled. The valves consist of two coats; the external one is of the consistency of the delicate bark of the smallest branches, and is marked on its convex surface with five longitudinal lines. The internal membrane is parchment-like (cartilaginous), strong and almost ligneous; its internal surface is smooth. The seeds are numerous, imbricated upwards, so that the lower ends are covered and the upper ones uncovered; they are small, elliptic, compressed, surrounded by

a membranous, transparent, oblong wing, which is frequently incised towards the lower end. Seminal receptacle between oblong and linear, inserted where the margins of the valves unite and form the dissepiment. It is dotted throughout its whole length, and these dots are the cicatrices left behind by the seeds.

The following are the dimensions in Paris feet in decimal parts :—The tree 6—7 toises high ; the trunk 1—2 feet in diameter ; the leaf 3–6‴ long, 1′ 6‴ broad ; the leaf-stalk 8‴—10‴ long, 1‴—1½‴ thick ; calyx 0.5‴ high, 0.7‴ broad ; tube of the corolla 4.7‴ long, 0.9‴ broad ; the margin of corolla (a Lacinia) 1.4‴ long ; stamina 4.9‴ long ; the filament in its free part, 2.3‴ long ; the same, as far as it is fixed to the corolla, 1.0‴ ; anther 1.6‴ long ; pistil 5.9‴ long ; stigma 1.1‴ long ; capsule 6.7‴ long, 2.8‴ broad ; seminal receptacle 4.2‴ long ; seed (*i. e.* its centre without the wing) 0.8‴ long, 0.6‴ broad ; wing 1.5‴ long, 0.8‴ broad.

This species of cinchona is the most valuable of all which have been hitherto discovered in the Andes. It is the most effective and most sought after. It grows wild in the neighbourhood of the town of Loxa, in an extent of 275 Spanish square miles, and in no other parts not only of the province of Quito but of all America. It is met with neither at all elevations nor in all temperatures of the Andes. It is found only at a barometrical pressure of between 22—23‴, and at a temperature of between 14° to 18° R., in a zone having 1321 Varas east latitude, and at an elevation of from 1898 V. east to 3220 above the level of the sea. It is found between 3° 42′ and 4° 40′ southern lat. Its eastern terminus lies in 6° 35′ westward of Quito, and the western terminus in 1° 45′ from the same meridian. The natives call it *cascarilla fina amarilla*, and never quina. It flowers very probably twice, in July and August, and in December and January. The leaves fall successively, as is the case with most equinoctial plants. By the epithet *amarilla fina* it is distinguished from *colorado fina*, which differs from the typical principal form by the colour of the fresh bark, which is reddish, whereas the other, as has been stated above, is yellow. This quality, however, does not appear to be permanent, for when the amarilla is dried it assumes the colour of the other sort, so that the most experienced person is unable to distinguish one from the other. There are, however, a few other distinguishing characters. The leaves of colorada fina are thicker and more obtuse; the corolla is of a more beautiful rose-red, and slightly larger. The capsule is a little thicker; the glands in the axils of the nerves are common to both species.—[*From Dr. Von Martius's German version of J. J. de Caldas's Spanish manuscript, written* 1805—9, *and published at Regensburg on the 7th July*, 1846, *in No.* 25 *of the Flora.*]

ON THE CAMPHOR-TREE OF SUMATRA.

BY DR. W. H. DE VRIESE,
Professor of Botany at the Royal University of Leyden.

For many years past a distinction has been made between the Camphor-tree of Sumatra and Borneo, and that of Japan and China. The Japan or Chinese Camphor-tree is *Laurus Camphora*, L., belonging to the Laurels. It is a large and sometimes very thick tree, and may be recognized at first sight by its shining triple-nerved leaves. The camphor is partly obtained from this tree by incisions in the trunk, the juice that streams out of it being gathered in bowls. This method produces the purest camphor. Another kind is obtained by decoction and distillation of the wood in an iron pot, furnished with a cover, or covered with another oblong iron pot, filled with straw or reeds. The camphor is sublimated by an elevated temperature, adheres to the straw, and is exported to Europe in slices. Formerly the camphor was only refined in Holland ; the process is now known elsewhere also. This is the camphor commonly sold in Europe, and is generally of a low price. Several other plants, chiefly of the Order *Labiatæ—Mentha, Salvia, &c.*—contain camphor, but in a small quantity. The camphor of Sumatra and Borneo, as well as the tree producing it, was always supposed to differ from that of Japan and China. At a remote period it was thought to be more precious and more medicinal than that of Japan, and at the present day the camphor of Sumatra is sold at a very high price, particularly to the Chinese ; that of Japan and China, on the contrary, may be purchased at a low price.

The most varying accounts of the history of the Camphor-tree of Sumatra are given both by earlier and more recent authors. Some of these notices may be

considered as entirely contrary to the truth, others are inaccurate, and very few are exact. The examination of them all would occupy too much time.

The Camphor-trees of Sumatra and Borneo were mentioned in the latter part of the sixteenth century. The first mention of it occurs in the "*Eerste Scheepvaart der Hollandsche natie naar Oost-Indië*, 1595—7," to be found in "*Begin en Voortgangh van de Vereenigde Nederlandsche Geoctroijeerde O. I. Compagnie ; gedruckt in den jare* 1646."

What is told us of this tree by Valentyn, in the year 1680, is in many respects remarkable, and proves at the same time how much the tree was already considered worthy of attention. Mich. Bernh. Valentyn gives the following statement on this subject, which was in 1680 communicated to him by Arent Sylvius :—

"The Camphor-tree is found in several forests. Without any culture or human aid, it grows luxuriantly like other forest-trees, and elevates its lofty, heavy, unbranched, and straight trunk, and forms a crown of moderate extension, but which may be called small in proportion to the trunk, and which is furnished with few and not heavy branches.

"The leaves are oblong ovate, with a strong lengthened point ('apice prolixe extenso'). In a dry state they are of a dark green colour. They are hard, tough, and smell like camphor. This is said of the tree of Baros, for in that of Java (that is, of Japan) the leaves are differently formed and much larger than those of the tree first mentioned, as may be seen by the seventh plate of Valentyn.

"The bark is fine and reddish ; when the tree becomes old and thick, it falls off in large pieces : by this property the tree may be partly distinguished from others. Roots several feet in length are also often to be seen above the ground.

"The fruit, which is obtained with difficulty in consequence of the height of the tree, resembles more a flower than a fruit, as it has more or less oblong and thick variously-coloured leaves, which are generally red, violet, yellow, or greenish, and enclose the fruit like a hazel-nut. The fruit has a hard shell ; the enveloping leaves are elevated above it, and are not pointed, but have red tips, spread out above like the petals of a tulip. The fruit, which, like the leaves, has a taste of camphor, is not only useful for medicinal purposes, but may be employed as food, and, like many other fruits, makes a good confection. The fruit is not easily obtained, as it is dangerous to penetrate the woods.

"When the tree has attained some size, the resin does not stream out like benzoin ; but near the pith, or heart, are natural fissures, in which the juice accumulates, which, gradually coagulating, sticks to the wood in the form of small pieces of camphor.

"If those who have the care of the Camphor-trees perceive that in some of the trees there is camphor (which they pretend to discover by some signs known to them), they order the trees to be cut down, strip them of their leaves and bark, and cut away the outer wood to the marrow or heart, in which are the apertures or fissures ; they cut that wood into small pieces, and therein the camphor is found, beautifully brilliant. They have a method of scraping it from the wood with small instruments ; and after purifying the scraped-off camphor (*camphora abrasa*) they seldom obtain more than from two to three pounds. Of that, one-twentieth is generally paid as a tribute ; the rest remains in their possession.

"Camphor-oil, the peculiar juice of the tree, exudes from its fissures and cavities, and is carefully collected. The oil is so fine, that a paper penetrated by it and held near a flame, catches fire immediately and burns till all the oil is consumed.—Oct. 2, 1680."*

We must not omit to mention that Valentyn† has given a drawing of the leaves of a Camphor-tree of Baros, which agrees very well with the objects before us, so that we do not doubt that Arent Sylvius, from whose accounts this chapter is written by Valentyn, really knew the tree, and in what respects it differs from that of Japan.

I would recommend further the notices given of this tree by Breyne,‡ Grimm,§

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* Valentini, *India Literata, seu dissertationes epistolicæ de plantis*, &c., p. 488. Francof. 1716, fol.

† Mich. Bern. Valentini, *Hist. Simpl. Reformata*, lib. ii., sect. iv., p. 250.

‡ *Prodr. fasc. Pl. rar.*, 1680.

§ *Obs. de Arb. Camphoræ, in Miscell. Cur. sive Ephem. Nat. Curios.*, 1683, p. 371, tab. c. f. 33.

Rumphius,* Charles Miller,† Adolph Eschelskroon,‡ Radermacher,§ Houttuyn,‖ Gærtner,¶ Colebrooke,** Roxburgh,†† and William Jack.‡‡

I will here repeat the diagnostic description given of this tree elsewhere, founded upon specimens from Sumatra, collected by Dr. Junghuhn.

DRYOBALANOPS, *Gærtn., Colebr., Jack.*

Calyx inferus, monophyllus, cupulatus, limbo demum 5-alato, alis patentibus. *Corolla* infera, 5-partita (vel 5-petala, petalis basi junctis), laciniis ovato-lanceolatis. *Stamina* hypogyna, plurima, monadelpha, annulo in basi corollæ inserta; antheræ subsessiles, biloculares, elongatæ, lineares, loculis membranaceis, mucronatis. *Ovarium* superum, ovatum, stylo post anthesin sæpe persistente acuminatum, triloculare, loculis biovulatis. *Styles* filiformis, staminibus vix longior. *Stigma* vix distinctum (nec capitatum). *Capsula* unilocularis, trivalvis, monosperma, calyci aucto partim insidens, partim ejus, laciniis auctis alæformibus cincta. *Seminis embryo* exalbuminosus, inversus, cotyledonibus inæqualibus carnosis chrysaloideo-contortuplicatis.—Arbores *excelsæ Sumatram insulam habitantes*, foliis *alternis coriaceis*; stipulis *caducis*; floribus *paniculatis, terminalibus et axillaribus*.

Dryobalanops *Camphora*, Colebr.; foliis ovatis obtuse acuminatis basi acutis superne nitidis dorso opacis parallele venosis carinatis.

HAB. Regions. 0-1000′; prope Tapanuli et Huraba.

SYNONYMA.

De arbore Camphoræ litera Wilhelmi ten Rhyne ad Jacob Breynium: Prodr. ej fasc. rar. plant. Gedani, 1683.

Arbor Camphoræ, Grimm, Observ. in Miscell. Cur. sive Ephem. Nat. Curios. 1683, p. 371, cum tab. fig. 33 (mala).

Arbor Camphorifera, Valentini, Ind. lit. p. 488, 1716, ex auctoritate Arent Sylvii.

Arbor Camphorifera, Mich. Bernh. Valentini Hist. Simpl. Reformata, lib. ii., sect. vi., p. 230. Rumphii Herb. Amb. Auct. cap. lxxxii., p. 67. 1755. Ch. Miller, in Phil. Trans. vol. lxviii., p. 1, pp. 161, 170, 188.

Lauras foliis ovalibus acuminatis lineatis, floribus magnis tulipaceis, Houttuyn, Nat. Hist. ii., 2, pp. 318, 319; Verh. Holl. Maatsch. van Wet. xxi. 272.

Dryobalanops aromatica, Gærtn.? Suppl. Carpol. vol. iii. 49.

Dryobalanops Camphora, Colebr., Asiatic Researches, vol. xii., p. 537, 1818.

Dryobalanops Camphora, Colebr., in Jack's Descr. of Malayan Plants, Hook. Comp. vol. i., p. 253. 1835.

Shorea Camphorifera, Roxb.? Fl. Ind. vol. ii., p. 617. 1832.

Pterygium teres, Correa? Ann. du Mus. vol. x., p. 159, t. 8, f. 1.

Dryobalanops Camphora, Colebr. in Hayne's Arzn. Gew. xii., 17.

Dryobalanops Camphora, Colebr., Korthals, Verh. over de Nat. Gesch. der Oost-Ind. Bezitt. (Kruidk.) p. 45.

ADUMBRATIO.

Arbor 100′; trunco valido, stricto, columnæformi, 60′-70′ alto, 11′ crasso, ad basin expansionibus laminaribus radiantibus instructo; cortice exteriore ibidem flavo, scabro, strato resinoso, splendente, partim albo partim flavescente, sæpe crasso, pellucidoque instructo; sursum fusco, demum in ramis ramulisque e griseo-fuscescente obtecto. Lignum ipsum fuscum.

Folia alterna (nec opposita), petiolata; petiolis dorso rotundatis, superne sulcatis, sæpe curvatis vel inflexis et ramis accumbentibus, 0,01-0,02 longis, immo longioribus;

* *Herb. Amb. Auct.*, cap. lxxxii., p. 67. 1755.

† Extracts from several Letters from Mr. Charles Miller, giving some account of the interior parts of Sumatra.—*Phil. Trans.*, vol. lxviii., p. 161, 170. 1778.

‡ *Beschr. van Sumatra, inzonderheid van dezelfs Koophandel. Door Ad. Eschelskroon*, p. 61—63. 1783.

§ *Verhand. van het Bataviaasch Genootschap*, vol. iii., p. 27. 1785.; vii. *Batavia*. 1814.

‖ *Verh. der Holl. Maatsch. van Wetensch.*, pt. viii. 1784.

¶ *Suppl. Carpol.*, vol. iii., p. 49.

** *Asiatic Researches*, vol. xii., p. 537. 1818.

†† *Flor. Ind.*, vol. ii., p. 617. 1832.

‡‡ Hooker's *Companion*, vol. i., p. 253. 1835.

ovatis, basi acutis, apice subito angustatis, obtuse acuminatis, margine integerrimis, versus apicem subundulatis, utrinque glabris, coriaceis, superne nitentibus, medio sulcatis, dorso opacis carinatis, parallele venosis, demto petiolo 0,06-0,07 longis, et 0,33 fere latis.

Stipulæ geminatæ, subulatæ, caducæ (Colebr.); ovatæ, acutæ (Korth.); in specimínibus Junghuhnianis nullæ. An forsan omnes lapsæ?

Pedunculi axillares et terminales, breves, incrassati.

Calyx (junior non visus) adultus auctus, hemisphæricus, campanulatus, basi lignosus, admodum crassus; interna structura magnum referens numerum lacunarum aërearum, in quinque excrescens alas foliaceas, coriaceas, rigidas, erectas, patentes, reflexas, sinu exciso rotundato amplo a se invicem distinctas. Alarum formæ et diametri diversæ sunt pro diverso evolutionis stadio; in fructibus immaturis magis sunt elongatæ, et versus medium et apicem dilatatæ, 0,07 longæ et fere 0,01 latæ (spec. Hontt. et Jungh.) et in illo stadio quoque erectæ; in maturis (Colebr.) contra magis dilatatæ, vere spathulatæ, reflexæ. Structura alarum est parallele nervosa et inter nervos, reticulata. Calyx totus terebinthinam redolet.

Corolla (secundum specimen lectum a Millero fil. et nobiscum communicatum ab Ill. Rob. Br. ex Mus. Brit. Lond.), caduca, monopetala, 5-partita, laciniis imæ basi inter se ecalitis membranaceis, 0,015 longis, 0,004 latis, lanceolatis.

Stamina in fundo corollæ annulo proprio dentibus triangularibus acutis erectis instructo insidentia, numerosa. In specim. Mill. 15 numeramus, sed plura lapsa sunt. Filamenta brevissima; antheræ biloculares, introrsæ, in dorso linea media (connectivo) in mucronem ultra loculos elongata notatæ; loculi membranacei, tota longitudine dehiscentes, marginibus locularum involutis.

Capsula glandem quercinam simulans, supera, ovata, stylo coronata, lignosa, fusca, externe striis longitudinalibus tenuibus præcita, basi cupula rotundato-gibba hemisphærica excepta, eique firmiter adhærens, unilocularis, trivalvis, valvis æqualibus crassis, monosperma, 0,035 longa, 0,015 lata (Colebr.), 0,03 longa, 0,015 lata (Gærtn. si eadem est ejus species quæ Colebrookii, quod incertum).

Semen solitarium, magnum, cavitati capsulæ respondens, ovato-oblongum, antice sulcatum, integumento fusco ad sulcum intus flexum, et cum columna centrali colliquescens. Columna centralis e fundo cupulæ calycinæ orienda, ad verticem adscendens, semen in illa directione in duos dividens lobos dorso connatos, inde aucta; lobis longitudinalibus, mollibus, columna brevioribus, intra cotyledonum plicas sese demergentibus; duobus majoribus lateralibus ad ventrem recurvis; duobus minoribus dorsalibus citra axem productis divergentibus (Gærtn.).

Albumen nullum.

Embryo constans 2 cotyledonibus, carnosis, imparibus. Externus maximus, seminis formam constituentibus; interior multo minor, lateralis, subcochleatus. Plumula simplex, conica, diphylla. Radicula longa, sursum directa, in sulco cotyledonis externi contenta, apice conico obtusiusculo terminata, adscendens, supera. (Juxta spec. Marsdeni Mus. Brit. Londinensia et descript. Cel. Gærtn.)

The tree here described belongs to the Natural Order *Dipterocarpeæ* (Bl. Lindl.). All the trees belonging to this family are gigantic and of a majestic appearance, and are chiefly remarkable for the beautifully coloured and winged fruits. All of them contain more or less of a balsamic resin. *Shorea robusta* produces a resinous substance, which is used at the religious solemnities of the Indians. *Vateria Indica* yields a resin which in India is used as copal, and is known in Europe as *axime*-resin. The Javanese species of *Dipterocarpus* are all resinous, and the resin is said to be used as copaiva-balsam.

The camphor-tree is one of the loftiest of the Indian Archipelago. In its dimensions it surpasses even the rasamala-tree (*Altingia excelsa*) of Java. It is the giant among the trees of the East Indies. Its trunk rises vertically, and divides into branches only at the top, forming a somewhat convex crown. A person looking over the tops of the trees from an elevated place, for instance, from the mountains behind Loemoet, at a height of from three to four hundred feet, can without difficulty count the full-grown camphor trees that are scattered in the forest; for, while the *Anonaceæ*, *Acacias*, *Ficoideæ*, and figs, which compose the chief mass of trees in those forests, are eighty to a hundred feet high, the camphor-tree, with its gigantic crown, is seen rising fifty or even a hundred feet above them, as the steeples of churches appear above the roofs of the houses in a town. The following are its dimensions, compared with those of the rasamala (*Liquidambar Altinghiana*):—

	Thickness of the trunk.		Length of the trunk.	Diameter of the crown.
	Beneath.	Above.		
Camphortree	7-10 feet	5-8 feet	100-130 feet	50-70 feet
Rasamala	5-7	3-5	70-90	40-50

Near the ground the Camphor-tree gives out radiating extensions of the trunk and root, such as several travellers have represented in their descriptions. At the lower part of the tree the bark is rugged, with fissures, and often covered with a resinous and glittering, sometimes yellowish substance, which is transparent, and consists either of camphor or of camphor and its peculiar resin. Higher up, the bark is of a dark grey colour, here and there covered with lichens, but not with *Lianes*, like so many other trees.

The position of the leaves is alternate, as shown in the drawing of Houttuyn. Colebrooke describes a branch without fruits, *with opposite leaves*. Has *Dryobalanops Camphora* sometimes a position of leaves such as Colebrooke describes? We can scarcely doubt the accuracy of his descriptions—they have too much the appearance of truth about them; and all that he has communicated of the tree and of the substances which it produces, gives us the conviction that Mr. Colebrooke must have had specimens of this tree; we are not, however, certain of the correctness of his figure.

The leaves seen by us differ from those of Miller's specimens, which we saw in 1850 in the British Museum (which are much larger), and from those of Colebrooke's drawing and description; the largest leaves of the latter being 0,175 long and 0,05 broad. But this difference is perhaps explained by ours being smaller, because they are on flower-bearing branches. They most resemble the description given by Houttuyn.

Most authors speak of stipules (Colebr., Korth.). We have not seen them, and suppose that our specimens have lost them; we must therefore refer our readers to what the two last-mentioned botanists have written on the subject.

The calyx has many modifications in the form of its base and wings, as well as in the direction of those wings, which are sometimes nearer to each other, or more modified or reflexed. The great diversity which we have observed in our specimens persuades us that there is no reason for accepting more species. Colebrooke has seen and drawn objects in full growth. In the different states of development in which we saw this calyx, we always found natural cavities in its tissue, chiefly in the woody part. In the interior it is resinous, and emits a smell of turpentine.

We have not space for further descriptions of the crown, the stamens, and the fruit. The albumen seen by us was in some of Marsden's specimens in the British Museum, preserved there in spirits: it agrees entirely with the figure and description given by Gærtner. In the specimens at our disposal, which were not preserved in spirits, the albumen was consumed. For these specimens we are much indebted to the liberality of Mr. Robert Brown. Through lack of young specimens, the structure of the ovary has been till now but imperfectly known. The reason is, that naturalists have not had the opportunity of getting specimens at the time of the development of the flowers.

Dryobalanops Camphora, Colebr., must be the plant mentioned by Grimm, Rhyne, Valentyn, and Rumphius. It is the same as that mentioned by Miller, and which M. Radermacher presented to Houttuyn. It belongs undoubtedly, to the same genus as Gærtner has represented as *Dryobalanops*, but it is doubtful what he means by his *D. aromatica*, which, he says occurs in Ceylon, and yields the best cinnamon. Here may be an error. The uncertainty is increased by his not giving characters of the species; and the identity with the species of Colebrooke cannot be decided. There seems to be some mistake in the account of Gærtner, for no *Dryobalanops* has ever been found in Ceylon, and it is impossible that a *Dryobalanops* should produce cinnamon, and that even the best in Ceylon. Perhaps he was misled by inaccurate statements on the labels of some of Sir Joseph Bank's specimens. Hitherto our efforts to arrive at some certainty in this case have been unsuccessful. If it be decided that the plant mentioned by Gærtner is the same as that of Colebrooke,

then, according to the opinion of some botanists, there would be a reason for adopting the name *D. aromatica* of Gærtner, instead of that of Colebrooke. But, first, that reason does not yet exist; and we think that we should maintain the system established among botanists, that no priority can be given in science to a name of a plant unaccompanied by a description. It is possible that Gærtner had the description of his species in manuscript, but he did not publish it. *Shorea*, Roxb., and *Pterygium*, Corr., have been described later than Gærtner's *Dryobalanops*, and must therefore be represented here as synonymous.

Geographical Distribution.—The region in which the camphor-tree is found, extends, in latitude, from Ajer Bangis to Singkel, or nearly from 1° 10′ to 2° 20′ N. It is not met with more southward than Ajer Bangis; whether it grows further north than Singkel is unknown (Jungh.). Within these parallels it extends along the south-western side of Sumatra, from the coast to a considerable distance in the interior, and is found on the mountains as high as from a thousand to twelve hundred feet. As those mountain-chains which are near the coast, and most of the central valleys of the mountains which extend parallel to the coast, that is, in a direction from S.W. to N.E., are much higher than 1000 feet, it is clear that this tree has a very limited region, occupying but a small part of south-western Sumatra: it is also confined to the outer slope of the mountains, whence it descends into the alluvial plains, though it approaches the sea only in those parts where the ground is not swampy. It is found most abundantly, and in the best state, on the outlying hills of the mountain-chain and on the lower slopes of the mountains themselves, at a height of from three to five hundred feet; and here the camphor is collected in the greatest quantity.

The camphor-tree was seen by Dr. Junghuhn on the promontory of Caracara, near Telo; on the alluvial plain of Loemoet; on the mountains of Hoeraba, behind Sibogha; and on the ridges of hills in the south of Loemoet, &c. He found it growing on weather-beaten granitic and trachytic hills, on yellow-red clayey soil, abundantly furnished with oxide of iron, and also on a rich alluvial soil abounding with humus.

Climate and Temperature of the region of the Camphor-tree.—On the coasts the mean annual temperature is but 80,6° (on the island of Java 82°), and nearly 78° Fahr. at 1000 feet, the most elevated limits where the tree is still found, thus much lower than in Java.

There are two causes particularly, that bring about this depression of temperature: first, the narrowness of the level shore of the coast, immediately at the foot of high mountains; secondly, the uninterrupted dense forests, with which not only the mountain-chain itself, but the coast-plain is covered. These circumstances produce a greater humidity, and at the same time a greater coolness of the air, at an inferior elevation than in Java.

At the eastern foot of the Sumatra mountain-chain there are extensive arid and barren plains, only overgrown with alang-alang (*e. g.*, at Pertibi). Over the heated soil of these plains the air becomes extraordinarily rarified: the cooler sea-air rushes in, coming from the ocean on the western side of Sumatra, where the sea is deep, and where no land exists for a great distance; and a west wind arises, which, partly kept back by the obliquely situated mountain-chains, changes into a north-western one. This wind carries the humidity of the sea towards the mountains, by the summits of which the moisture is soon condensed and changed into clouds. These, during the whole year, at intervals almost daily, at regular hours, but chiefly in the afternoon, shed heavy showers over the land, while the thunder roars in the mountains. The dampness of the air is then so great, that mist and clouds are for many days seen hanging immoveably even over the woods of the lower coast-lands. Frequently, too, the wind blows by reverberation, in an opposite direction, like a hurricane, from the mountains to the coast.

Thus the camphor-tree grows in a very changeable and generally moist climate, where extreme states of heat and coolness by storm quickly follow each other. About eleven in the morning, in the serenest weather, there is frequently an oppressive warmth, while at noon heavy showers, driven on by a north-west wind, and accompanied by thunder and lightning, seem to cover the land.

Surrounding Vegetation.—One consequence of the unsettled character of the climate, of the low elevation of the clouds, and of the cooler temperature in general, is the occurrence of some trees and plants near the sea-coast, which in Java are met with only at a greater height. Thus the camphor-tree grows often in company, not only with species of *acacia*, *anona*, *michelia*, and *dipterocarpeæ*, but also with oaks;

and it is found with marsh *cassrina*, with the Nipong Palm (*Oncosperma filamentosum*), and with benzoin-trees. Amidst the underwood of the forest are seen species of *melastoma*, *elettaria*, and other *scitaminea*, with *Vitex trifoliata* (which occurs most frequently), and several species of *rubus*. These plants are seldom found in Java below 3000 feet.

Signs of the presence of Camphor in the tree.—According to the observations of Dr. Junghuhn, the young trees do not contain camphor. The inhabitants of the Batta-lands are accustomed to cut down the oldest and heaviest ones, although the age of the trees is not known; and in reference to a large camphor-tree which he saw near Tapanuli, the Rajah Ngabing told him, that his ancestors, as far back as the history of his family went, had known it of the same size. It was probably at least two hundred years old.

Camphor-oil and Camphor.—Camphor-oil, that is to say liquid camphor, occurs in all the trees, even in young ones, and exists in all parts of the tree, but most in the younger branches and leaves. The solid camphor is, however, found only between the woody fibres, and, therefore, only in the trunk. The natives do not know beforehand whether a trunk contains much or little camphor. If, however, there is a large quantity of camphor in the splinters or fibres of the wood, they decide that the fissures of the inner part contain a great abundance. When much gluey, half-solid young camphor shows itself on the radiating extensions, or in the fissures at the lower part of the trunk, they come to the same conclusion. However, the results are frequently fallacious, and they often uselessly cut down trees which produce but very little.

Collection of the Camphor.—The process of collecting the oil and camphor from *Dryobalanops camphora*, was witnessed by Dr. Junghuhn, near Loemoet (Tapanuli), in Sumatra, at an elevation of 300 feet. The greatest quantity of camphor, in a solid as well as in a young and liquid state, is brought from a height of 1000 feet. The solid camphor is obtained by cutting down the trees, in the inner part of which fissures are found between the woody fibres, which extend longitudinally, and are filled with camphor. The young trees do not contain that substance, while the thickest and oldest, that are most filled with it, rarely contain more than two ounces. The natives who are occupied in collecting the precious product, go in a number of twenty or thirty men into those parts of the woods where the camphor-tree is most often found. They commence constructing cottages, intending to encamp upon the spot for some months. One-half of the company is occupied with severing the trunk near the root, and not, as many others have said, at from fourteen to eighteen feet above the ground. The others are engaged in gathering the camphor from the trees which have been cut down. From the extraordinary thickness of the trunks, it often happens that a whole day is employed in felling a single tree.

On his second expedition from Loemoet to Pertibi, in the year 1841, Dr. Junghuhn visited the bivouac of such a company in the neighbourhood of Hoeraba, and by this means became acquainted with the method by which the natives obtain camphor or camphor-oil from the tree.

The oil is collected in the following manner:—

1. Incisions are made through the outer and inner bark, at the lower part of the trunk close to the root, chiefly where the tree produces the before-mentioned woody radiations, which alternate with vertical cavities, which are also observed in other trees growing between the tropics. The clear, yellow, balsamic, oily juice, which is discharged very slowly, is collected in a half-cylinder of very thin bamboo, cut longitudinally. According to the observation of Junghuhn, who witnessed it, half a day was scarcely sufficient to half-fill a small tea-cup with this liquid, and even this small quantity was mixed with fragments of bark and other impurities. The collected juice is purified by pouring it through a kind of sieve, made from the fibrous tissue of the sheathing footstalk of a palm-leaf (*hindoe*).

The camphor is found as a varnished, gluey, and clammy covering, resembling turpentine, or in a solid grainy state, in the fissures of the bark, and in the laminary prominences. The surface near the root has chiefly a white covering, which is rarely thicker than one or two millimètres. This substance is highly estimated by the Battas, and fetches a high price.

Colebrooke, and many other authors who have written on this subject, have said that the camphor is obtained from the middle of the trunk, and that every tree should produce a quantity of eleven pounds; the camphor being found in the heart of the tree in such a quantity as to fill a cavity of the thickness of an arm. This is

quite exaggerated, and must be founded on an error. If it were true, the price of camphor would be lower than it is now. At Padang and at Tapanuli the price of a hundred pounds of camphor is nearly £250. Such a quantity would in that case be obtained from nine trees. That proportion is highly improbable, and suffices to show the inaccuracy of the account. On the contrary, the camphor only occurs in fissures of the wood, and the native of the Battas scrapes it off with small splinters or with his nails.

2. By maceration and decoction of the branches and pieces of bark and wood, another liquor containing camphor is obtained, but still in small quantities, and much mixed with water. The wood is cut into small fragments, and the leaves are bruised and boiled with water in an iron kettle, at the time that the trunk is being cut down, in order to use the pieces in their fresh state. In boiling, an oily substance rises to the surface, which is taken off with the shell of a cocoa-nut cut in half and provided with a handle. The liquor is poured into a bamboo, and closed in with a stopple formed of *hindoe* fibres, and at the return of the expedition after many months it is poured into bottles. Dr. Junghuhn has two bottles filled with the liquid at the place itself.

After a long stay in the woods (frequently of three months) the company, consisting of thirty persons, departs. It frequently happens that during that period they fell more than a hundred trees, and yet they rarely take with them above fifteen to twenty pounds of solid camphor, worth £40 to £50.

Use and Price of the Camphor in Sumatra.—Camphor is here collected in a comparatively small quantity. While some thousands of quintals of benzoin are yearly sent into the European markets (*e. g.*, in 1837 three thousand), but ten to fifteen quintals, and often less, are sent of Sumatra camphor. The price is £2 10*s.* a pound. It generally comes from Baros, whence the name of Baros camphor. From that place several caravans set out yearly to collect this substance in the woods. The same product comes from Tapanuli, Natal, and Ajer Bangis. It is not exported, for it is collected for the use of the natives wherever the tree grows.

Besides the small quantity which is employed as a remedy against various diseases, we must mention here a particular use, by which a great deal of camphor is wasted, and its rarity and price much increased; and this lavish application of it, together with the slaughter of hundreds of buffaloes sometimes in one day, is one of the principal causes of the poverty of the Batta royal families (Rajahs).

A very ancient custom prescribes, that at the death of a considerable person among the Battas, who, during his life, had a claim to the title of Rajah (sovereign prince), rice be sowed in a sacred place, and that the corpse be kept above ground among the living till the rice has sprung up, grown, and borne fruit. Not before the rice is ripe and gathered in do they think it right to bury the corpse, and it is actually interred with the ears of the rice that was sown on the day of the decease. Thus the burial takes place after five or six months. (The remarkable ceremonies of such a funeral are elsewhere described by Dr. Junghuhn.) The corpse, like the rice-grain six months before, is then committed to the earth; and thus the hope is emblematically expressed, that, as a new life arises from the seed, another life shall begin for man after his death.

During the period previous to interment, the corpses are preserved in wooden coffins within the houses, the women wailing day and night. Trunks of *Durio Zibethinus* (the Durian) are hollowed out to contain the bodies. They are carved with much art, and have at the under part small apertures, through which the fluids may escape. The corpses contained in these coffins are not only spread over with pounded camphor, but entirely covered with it, in such a manner that all the space between the coffin and the body is filled with it. This is the only means known to the inhabitants of the Batta-lands of preserving the bodies of their kings, without smell or corruption, during so many months, in the humid air of such a hot climate. Dr. Junghuhn saw a corpse which had been preserved in this manner during four months, and which was shrunk up like a mummy, and emitted no smell but the penetrating odour of the camphor.

In this way an immense quantity of camphor (a quarter to half a quintal) is consumed, for the purchase of which the family of the deceased king must make the greatest sacrifice, and often sell all their cattle. Every village has such a rajah.—*Hooker's Journal of Botany.*

ON THE MANUFACTURE OF NITRATE OF POTASH (SALTPETRE).

Previous to the middle of the seventeenth century, the chief part of the saltpetre consumed in this country was obtained from refuse animal matters, as is evident from the following edict, issued by James I., for the regulation of the "mynes of salt peter:"—"The king, taking into his consideration the most necessary and important use of gunpowder, as well for supply of his own royall navie, and the shippinge of his lovinge subjects, as otherwise for the strength, safety, and defence of his people and kingdoms, and how greate a blessinge it is of Almighty God to this realm, that it naturally yieldeth sufficient mynes of salt peter for making of gunpowder for defence of ittself, without anie necessitie to depend uppon the dangerous chargeable and casuall supply thereof from forraigne parts, hath sett downe certen orders and constitutions to be from henceforth inviolably kept and observed, for the better mayntayning of the breed and increase of salt peter, and the true making of gunpowder.

"Noe person doe from henceforth pave with stone or bricke, or floare with boarde, anie dove-house or dove-cote, or laie the same with lyme, sand, gravel, or other thing, whereby the growthe and increase of the myne of salt peter maie be hindered or ympaired, but shall suffer the floure or groumde thereof to lye open with goode and mellowe earth, apt to breede increase of the myne and salt peter, and so contynue and keep the same.

"That no inakeepers, or others that keep stables for travellers and passengers, doe use anie deceiptful meanes or devices whereby to destroy or hinder the growthe of salt peter in those stables. And that no stables at all be pitched, paved, or gravelled where the horse foote used to stand, but planked only, nor be paved, pitched, or gravelled before the plankes next the mangers, but that both places be kept and mayntayned with goode and mellowe earth, fitt and apt to breede and increase the myne of salt peter, and laide with nothinge which may hurte the same.

"That all and every such person and persons as having had heretofore had anie dove-house, dove-cote, or stable (which were then good nurseries for the myne of salt peter) have sithence carried out the goode moulde from thence, and filled the place agayne with lyme, sand, gravel, rubbish, or other like stuff, or paved or floored the same, whereby the growth of salt peter myne there hath been decayed and destroyed, shall and doe within three monethe next contryve to take up the pavements and boards agayne, and carrie out the said gravell, lyme, and offensive stuff from thence, and fill the place agayne with goode and mellowe earth fitt for the encrease of salt peter, three foote deepe at the least, and so contynue and keepe the same for the breede of salt peter myne. No person, of anie degree whatsoever, was to denie or hinder the salt peter man workinge any earth; nor was anie constable to neglect or to forbeare to furnish him with convenient carriages necessarie for his worke; and every justice to whom the salt peter man should address himself for assistance was at his peril to fail to render it, that his majesties service might not suffer by his default. And no one was to give any gratuity or bribe to the salt peter man for forbearinge or sparinge of anie ground or place which may be digged or wrought for salt peter."

To lessen the annoyance to the owners of these dovecotes and stable beds of saltpetre, and to promote the comfort of the pigeons, the saltpetre man was "to dig and carrie away the earth in such convenient time of the daie, and work it in suche manner as maie give least disturbance and hurte to the pigeons, and encrease of their breede, and in the chief tyme of breeding, that it be not done above two howers in anie one daie, and that about the middest of the daie, when the pigeons use to be abroade. And shall in like seasonable tyme carrie in the saide earth after it shall be wrought, and spreade itt there, and make flatt the floure of the dove-house, and leave itt well and orderlie."

In another proclamation issued two years after this, it was ordered that "whensoever anie ould building or house in London within three miles, is to be pulled down and removed, notice is to be given at the king's storehouse in Southwark, that the deputy may first take as much of the earth or rubbish as in his judgement and experience is fitted for salt peter for the king's service."

Soon after, we find that this enactment which caused much complaint, was repealed. "The manufacture of salt peter," says the king, "had hitherto produced much trouble and grievance to the liege, by occasioning the digging up the floors of their dove-cotes, dwelling-houses, and out-houses, and had also occasioned great

charge to the salt peter men for removing their liquors, tubbes, and other instruments, and carrying them from place to place, but now, divers compounds of salt peter can be extracted by other methods, for which Sir John Brooke and Thomas Russell, Esq., have received letters patent.

"To encourage so laudable a project, all our loving subjects," continues his majesty, "inhabiting within every city, town, or village, after notice given to them respectively, shall carefully and constantly keep and preserve in some convenient vessels or receptacles fit for that purpose, all the urine of man during the whole year, and all the stale of beasts which they can save and gather together whilst their beasts are in their stables and stalls, and that they be careful to use the best means of gathering together and preserving the urine and stale, without any mixture of water or other thing put therein. Which our commandment and royal pleasure being so easy to be observed, and so necessary for the public service of us and our people, that if any person be remiss thereof, we shall esteem all such persons contemptuous and ill affected both to our person and state, and are resolved to proceed to the punishment of that offender with that severity we may."

Sir John agreed to remove the liquid accumulations from the houses once in every twenty-four hours in summer time, and every forty-eight hours in winter time.

About the year 1670, the importation of saltpetre from the East Indies (where it is obtained as a natural product, being disengaged by a kind of efflorescence from the surface of the soil) had so increased as to affect the home manufacture, which has since gradually declined and become extinct. The manufacture of saltpetre from sources of the kind above mentioned, is not followed in this country at the present day, and it will be unnecessary to indicate here the processes employed in France, Sweden, Germany, and other countries for obtaining it by the decomposition of animal refuse, the more especially as full accounts are given in Knapp's *Technology*, Ure's *Dictionary of Arts and Manufactures*, and other standard chemical works; we shall therefore confine our attention to an account of the processes which have been proposed for obtaining nitrate of potash by the decomposition of nitrate of soda and other sources.

The first of these processes is that of adding nitrate of lime to a solution of sulphate of potash; sulphate of lime is precipitated, and nitrate of potash obtained in solution, which on evaporation yields crystals of that salt.

Mr. Hill's method of manufacturing nitrate of potash is by decomposing nitrate of soda by means of muriate of potash. For this purpose the nitrate of soda is put into a suitable vessel, made of wrought or cast iron, and dissolved in as much water as is required, and then the equivalent quantity of muriate of potash is added; decomposition ensues, with the formation of nitrate of potash and muriate of soda; the greater portion of the latter is separated during evaporation, as it is equally soluble at all temperatures. The nitre crystallizes on the cooling of the solution. Specimens of this nitre were shown at the Great Industrial Exhibition.

Mr. Rotch's processes for converting nitrate of soda into nitrate of potash are as follows:—

First process with American potashes (caustic).—In a suitable round-bottomed iron boiler, he dissolves 2000lbs. of the ashes in 1000 quarts of water, and then applies heat for three hours, at the end of which time the solution ought to be of a density of 45° Baumé (sp. gr. 1.453). In a similar boiler he dissolves 1300lbs. of nitrate of soda in 1200 quarts of water, applying the heat as before, until the solution becomes of the density of 45° Baumé. Both solutions are then allowed to stand for twelve hours to cool and settle. They should be heated to from 175° to 200° Fah., and then both poured into a third vessel or crystallizing pan, when the double decomposition will take place, and the crystals of nitrate of potash be deposited, this first deposition giving from 700 to 900lbs. of good merchantable saltpetre.

Care must be taken not to let the heat fall below 85°, at which the crystals form; and the better and more regularly the heat is kept up, the speedier will be the deposition of the crystals. The mother-liquor should then be poured off, and the crystals collected and thrown into the centrifugal drying machines, where they may be washed with weak mother-liquors. The portion of nitrate of potash that is left in the mother-liquor may be obtained by crystallization as before.

Second process with carbonate of potash (Pearlash).—The pearlash is dissolved in water, and the solution brought to a density of 40° Baumé (sp. gr. 1.384). This will cause whatever sulphate of potash may be contained in it to be deposited. The solution should then be left to stand for five or six days, after which it should be

poured off, and diluted with water, until its density becomes 15° Baumé (sp. gr. 1.116). Caustic lime should then be added in the proportion of one-fourth of the weight of the original quantity of carbonate employed. It should then be poured off from the carbonate of lime formed, heated and mixed with the solution of nitrate of soda, as above described. The precise proportions that the caustic alkali should bear to the nitrate of soda, are forty-eight parts of the former to eighty-six of the latter. The materials to be used should be tested, so as to enable the just proportions to be arranged according to the formula just given. The patentee states that by this means a nitre is produced which is equal to the Bengal saltpetre, after the latter has gone through the expensive process of refining.

A Stockholm manufacturer says :—"On dissolving nitrate of soda in excess of caustic potash solution, and evaporating to 28° or 32° Baumé (sp. gr. 1.241 or 1.285), the chief part of the saltpetre crystallizes, contaminated by the magnesia which is precipitated, and a small quantity of carbonate of lime. In order to obtain the whole of the saltpetre, the solution must be concentrated to 45° or 50° Baumé (sp. gr. 1.453 or 1.530). Here, however, a difficulty arises; the cast-iron crystallizing vessels are not impermeable to the liquor, which, whatever the thickness of the vessels, oozes through them, thus occasioning great loss. The saltpetre which still remains in solution after crystallization in the caustic solution at 50° Baumé (sp. gr. 1.263), cannot be collected, and if it be employed in the manufacture of soap, this will be found to contain so large a proportion of saltpetre, that it deliquesces and falls to pieces in a few days."

"A method employed in the Russian manufactories is first to dissolve the refined pearlash, and then the nitrate of soda in the relative proportions of water required for their mutual decomposition, or rather with an excess of potash in such a quantity of water that the resulting product remains dissolved at 50° Reaumur. The solution is then allowed to settle, whereby the carbonates of lime and magnesia deposit, after which the liquor is run off into wooden crystallizing vessels. As soon as the temperature is lower than 50° Reaumur, the principal part of the nitrate of potash crystallizes. The crystallization must now be very attentively watched, for as soon as the soda begins also to crystallize, the mother-liquors should be run off into other vessels, where a small quantity of nitrate of potash will crystallize, though the principal part of the product will be soda. The nitrate of potash and the soda must then be purified by new crystallizations. The salts formed from the mother-liquors must be redissolved with the nitrate of potash or the soda, according to which of the two most predominates."

Messrs. Crane and Jullion patented in 1848 the following method of manufacturing the nitrates of potash and soda:—The oxides of nitrogen evolved in the process of manufacturing oxalic acid, are mixed with oxygen gas or atmospheric air, and made to pass slowly through a chamber or other apparatus containing an alkali placed on trays (similar to the lime in a dry lime purifier), the mixed gases combine with the alkali, forming a nitrate of potash or soda, whichever alkali may have been employed.

De Sussex's process for the manufacture of nitrate of potash is as follows :—A solution is made of 166 pounds of nitrate of lead, and another of 76 pounds of chloride of potassium. The two solutions are then mixed, when double decomposition takes place, chloride of lead being precipitated, and nitrate of potash obtained in solution. In order to avoid the presence of lead in the nitrate of potash, a small portion of caustic or carbonated lime or magnesia is added, by which means any portion of the chloride of lead remaining in solution is precipitated. The solution of nitrate of potash is then evaporated and crystallized.

Nitrate of soda is obtained in the same way, by substituting sixty-six pounds of chloride of sodium for the chloride of potassium above mentioned.

ON THE VULCANIZATION OF INDIA-RUBBER, AND ON SOME OF THE PROPERTIES OF SULPHUR.

BY M. PAYEN.

The discoveries made in 1843 of the remarkable properties communicated to India-rubber by means of a peculiar sulphuration called *vulcanization*,* have generally been attributed to Hancock, an English manufacturer.

* The etymology of this word is derived from the word *volcano*, reminding us of one of the abundant sources of sulphur, which of late years has been extensively used in modifying the properties of caoutchouc.

Dating only from this period, the purposes to which this elastic substance is applied are of considerable importance, and have given rise to several new branches of industrial manufacture. Since this discovery, the changes which an elevation or depression of temperature caused in the organic body, have no longer any effect on the vulcanized product. It retains its suppleness and elasticity below 32° Fah., and does not soften or become more adhesive when heated above 105° Fah.; its temperature might even be raised to above 212° without its losing that tenacity necessary in its application to certain purposes, for instance, in transmitting the vapour of water and mechanical force by flexible tubes.

The principal conditions of success in this industrial operation were carefully determined, and several methods, which more or less realized the curious modifications of this sulphuretted body, were successively proposed in England, in America, and in France, but we were still ignorant of what the chemical reaction consisted in; there was no exact idea formed of that which was called the desulphuration; consequently, certain alterations which took place in this substance after having been in use (in many cases but for only a short time), were not understood, and consequently not prevented. I allude to the rigidity and fragility which is sometimes acquired, rendering it useless for those purposes for which it was destined.

The researches which I have the honour to bring before the Academy, are intended, and I think will aid in elucidating these points of applied science.

I shall in the first instance describe what takes place in one of the primary processes of vulcanization, still followed by several manufacturers. This will enable me more easily to indicate the effect of other processes.

If a layer of caoutchouc of about two or three millimètres in thickness be immersed for two or three hours in liquid sulphur at a temperature of from 230° to 240° Fah., the liquid will penetrate into the pores of the caoutchouc in the same manner as water or alcohol would, but more rapidly, and the weight of the layer of caoutchouc will increase to the extent of from ten to fifteen per cent.

Furthermore, as has been before stated, no great modification takes place in the properties of the organic matter; it may be moulded and soldered in its recent sections, as in a normal state, and solvents will attack it with the usual energy.

Nevertheless, its porosity will be diminished. If now, on immersing it in a substance itself inert, the temperature be raised to 275°, 300°, or 320° Fahr., in a few minutes the transformation takes place.

The object would not be attained if the action of the temperature were prolonged; the product gradually assuming a less flexible and elastic condition, would soon become hard and brittle.

This latter alteration would be yet more marked if the caoutchouc was maintained at the same temperatures (from 275° to 320°) in dissolved sulphur; the proportion absorbed of this latter body, would, in twenty-four hours for instance, gradually increase, until it became equal to the weight of the organic matter, or constituted 48 per cent. of the body itself.

From the commencement of the reaction of the sulphur at this temperature, and during the whole time it is prolonged, a slight but continuous disengagement of sulphuretted hydrogen takes place.* Even the liquid sulphur itself, when heated to a temperature of 300° Fahr., absorbs and retains a volume of this gas almost equal to itself.

A curious phenomenon results from the preceding fact: at the moment when the lowering of the temperature causes the sulphur to crystallize, each crystallized particle gives off a bubble of gas; sometimes these are disengaged, but sometimes attaching themselves to the crystals, they separate them and remain interposed, so that in a short time the entire mass becomes tumefied, and increases fifteen or 20 per cent. on its original volume, instead of diminishing, which would have been the case during a normal crystallization of pure sulphur.

Instead of causing the liquid sulphur to combine with the caoutchouc, at a temperature near to the fusing point of the former, the caoutchouc may be mixed with 12 or 20 per cent. of finely powdered sulphur, by pounding them together. The properties

* At the same time there is an equivalent quantity of organic matter separated, more charged with carbon than the caoutchouc, and which may be extracted when heated, by a solution of potash or caustic soda, which do not sensibly attack the mass of caoutchouc combined with sulphur.

of the organic substance are not by this means changed; it may be moulded and soldered, as in the normal state, and previous to admixture.

If the temperature be then raised to the degrees at which vulcanization occurs, it will take place as in the first case, and if the proper period for effecting this be exceeded, similar results to those already described will be attained.

Composition and Properties of Caoutchouc vulcanized by the means above described.

When the proper time has not been exceeded, the organic matter contains the sulphur in two different states; from 1 to 2 per cent. are retained in intimate combination,* the surplus simply remains interposed in the pores.

Sulphur in excess, uncombined, is gradually eliminated from the caoutchouc by the mechanical action which extension, by causing the pores to close, and contraction by causing the pores to open, alternately exercise on it. This effect continues for several months.

The elimination of the sulphur may be more easily and more completely effected by several chemical agents, especially by caustic solutions of potash and soda, with heat (this may also be effected without the application of heat, if the process be repeated several times for the space of a month); sulphuret of carbon, essence of turpentine, benzine, and anhydrous ether, may also be used.

These liquids cause the organic matter to swell to such an extent that it soon increases to eight or nine times its original volume. Ether removes the sulphur in a peculiar manner; a small proportion is in the first place dissolved, and this is transferred to the surface, where it separates in crystalline particles; other portions are successively dissolved from the interior and transferred in a similar manner, increasing the size of the crystals, which assume an octahedral form. Neither essence of turpentine nor benzine are capable of transferring the particles of sulphur to the surface, but retain it in the swelled substances. This peculiarity appeared to me to be owing to the energetic, and, I think, as yet unobserved solvent power of the essence or benzine. In order to prove this fact, I saturated these two liquors in a water-bath, using an excess of flowers of sulphur, and maintaining an equal temperature of 167° Fah.; the solutions were effected, imparting a yellow colour to the solvents; they were immediately filtered, and on cooling deposited crystals.

	In the Essence.		In the Benzine.	
The solutions contained when heated....	0.0587	...	0.0733	of sulphur
They retained, on cooling.....	0.0135	...	0.0173	"

The crystals also differed in form; in the essence, the very gradual cooling and the evaporation at 77° Fah., had caused the sulphur to be deposited in small octahedrons; if cooled rapidly needle-shaped prisms were deposited; in the benzine the crystals were prismatic. It is curious to observe the phenomenon of this latter crystallization in a glass tube. A number of transparent rectangular scales are seen to form, and to ascend and descend rapidly in the liquid; they agglomerate successively in the bottom of the vessel, in layers which gradually increase. After cooling at about 60° Fah., if evaporation be allowed to commence, a new crystallization is manifested, consisting of transparent octahedrons, which deposit themselves on the points of the opaque and yellowish scaly prisms first formed. If evaporated by heat, long silky layers are obtained. A drop of the same solution in benzine, placed when cold on the slide of a microscope, on evaporating deposits transparent octahedrons.

100 parts of sulphuret of carbon, when heated, dissolve	73.46	of sulphur.
100 parts of sulphuret of carbon, when cold, dissolve ...	38.70	"
100 parts of ether, when heated, dissolve	0.54	"
100 parts of ether, when cold, dissolve	0.188	"

On cooling in the sulphuret of carbon, the sulphur crystallizes in large octahedrons; in the ether, crystallization yields small octahedrons and a few prisms.

Ether and sulphuret of carbon, when retained in contact for some time with vulcanized caoutchouc, retain from four to five per cent. of caoutchouc in solution, which may be separated by treating it several times with ether to eliminate the free sulphur, and with anhydrous alcohol, which removes from 1. to 1.50 of fatty matter.

The caoutchouc thus extracted may be separated into two parts; the one, very ductile, dissolved, and thrown down by the benzine on evaporation; the other, more adhesive, less flexible, and undissolved. These two parts are obtained from the interior of the layers at a certain depth where the combination is not so intimate, and where there is less sulphur than near the surface.

The want of homogeneity in the combination of sulphur with the organic matter, is more marked in the two other methods of vulcanization which I propose presently to describe.

After its vulcanization the caoutchouc still consists of two parts, having unequal powers of cohesion and solubility; these may be ascertained by maintaining a thong immersed in a mixture of ten parts of sulphuret of carbon and one part of anhydrous alcohol for two months. The dissolved portion contains sulphur, which may be removed after drying by a solution of caustic potash, and there then remains the less aggregated organic substance, but slightly resistant, yellowish, and translucid. The undissolved portion remains in the form of a tenacious thong, having become browner and more transparent. The following are the proportions obtained in this experiment besides the fatty matter.—

Insoluble tenacious portion.	65
Soluble soft portion.	25
Excess of sulphur	10
	100

Vulcanized objects when applied on metals, more especially on silver, gold, copper, lead, and iron, act by their interposed sulphur; and the metallic substances brought in contact with them are more or less rapidly sulphurized. Amongst other objects, we may cite the washers placed between the flanges of tubes for transmitting the vapour of water at a pressure of from four to five atmospheres, and consequently exposed to the temperature of from 290° to 307° Fah., these soon lose their elasticity, and become hard and brittle, owing to the combination of the liberated sulphur with the caoutchouc. These disadvantages may in great measure be avoided by means of desulphuration by caustic alkaline solutions, or by adopting the new process of vulcanization, described at the end of this memoir.

Comparative experiments on caoutchouc, 1st, on the *normal* state, 2ndly, *vulcanized*, and 3rdly, *desulphurized*, show, that under the same conditions of immersion, during the space of two months, the absorption of pure water was from 0.200 to 0.260 in the first, 0.042 in the second, and 0.064 in the third.

Bottles of two millimètres in thickness, filled with water, and submitted to a pressure which doubled their diameter, lost in twenty-four hours, by continued transpiration, twenty-three grammes from caoutchouc in the normal state, and four grammes from the bottle of vulcanized caoutchouc.

Similar bottles filled with air, and under the same pressure, did not in eight days lose anything appreciable.

The sensible loss of water through a thin layer of caoutchouc will be readily understood, the liquid introducing itself by capillary force into the pores of the organic substance, and replacing in a continuous manner; the portions which evaporate at the outer surface.

It will also be easily conceived that air, and generally speaking gases, cannot act in the same way.

The process of vulcanization without the application of heat, the discovery of M. Parkes, consists in plunging layers or tubes of caoutchouc in a mixture of 100 parts of sulphuret of carbon and 2.5 parts of protochloride of sulphur. The liquid, in penetrating into the organic substance, causes it to swell, and deposits the sulphur which unites with the caoutchouc, relinquishing the unstable combination which it formed in the chloride.

The superficial portions would be too strongly vulcanized, and would become brittle if care were not taken to withdraw the objects at the end of two or three minutes, and to immerse them immediately in cold water, as has been recommended by M. Gérard.

In this case, the chloride of sulphur decomposed by its contact with the water, ceases to act on the surface, while those portions first absorbed continue their sulphurizing action in the interior.

* This combination does not alter the relation between the elements of the organic matter, which is represented by the formula $C_5 H_4$, this fact I have proved by several analyses made with the co-operation of M. Péligot, both on caoutchouc in the normal state, and in one of its two unequally soluble parts, and on the compositions containing from 0.015 to 0.485 of sulphur.

This, as may be perceived, is an ingenious means of regulating this kind of vulcanization without heat.

A process which appears to be still preferable, both as regards the salubrity and regularity of the operation, is due to the same inventor. It consists in immersing the objects to be vulcanized in a solution of protosulphuret of potassium at 25° Beaumé, this must be continued for three hours in a closed vessel, and maintained at a temperature of 284° Fahr. ; it must then be washed in an alkaline solution, and afterwards in pure water. By this means, we are enabled to combine the desired proportion of sulphur with the caoutchouc, without leaving an excess interposed in the pores, and in this process we also avoid the disadvantages of the unequal sulphuration of the organic substance.—*Comptes Rendus.*

ON COD-LIVER OIL.

BY DR. F. L. WINCKLER.

The constituents of genuine cod-liver oil, are, according to Dr. De Jongh's analysis :—

Gaduin? (a so-called organic substance)	Bilifulvin
Oleic acid	Iodine, Chlorine, and Bromine
Margaric acid	Phosphoric acid
Glycerine	Sulphuric acid
Butyric acid	Phosphorus
Acetic acid	Lime
Fellinic acid	Magnesia
Cholic acid	Soda
Bilifellinic acid	

Hence, therefore, its composition would be quite analogous to that of the other fatty oils ; but with the addition of small quantities of some of the constituent parts of the bile and also of iodine, bromine, and gaduin. But my own investigations have led me to regard cod-liver oil as an organic whole, of a peculiar chemical composition, differing from that of all other fatty oils hitherto employed as medicines. I prove this assertion by the following facts :—

1. If genuine cod-liver oil from Berg (the light clear sort) be saponified with potash, and the thus obtained and purified soap be decomposed by tartaric acid, we obtain oleic and inorganic acid.

2. If a mixture, consisting of a solution of six parts of caustic potash, twenty-four parts of distilled water, and twenty-four parts of cod-liver oil, be left for several days standing at the ordinary temperature and frequently shaken, then diluted with twenty-four parts of distilled water, and distilled, the distillate possesses the most intense odour of cod-liver oil, and contains a considerable quantity of a peculiar organic compound : oxide of propyle.

3. If nine parts of cod-liver oil be saponified in a porcelain vessel, by five parts of oxide of lead in the water-bath, and the required quantity of distilled water added, the cod-liver oil is decomposed into oleic acid, an inorganic acid, and a new acid, namely, *propylic acid*. The greatest portion of this acid, as well as of the oleic and inorganic acids combine, as it appears, with the oxide of lead, to form a basic compound. Another, very probably, acid salt of lead, can be extracted from the plaster-mass by washing it with distilled water. Not a trace of the hydrated oxide of glyceryle is formed on this occasion. The mass smells very disagreeably of train oil and herring, and if exposed in very thin layers in the water-bath, to the influence of atmospheric air, it assumes a dark-brown colour after the water is evaporated, at the same time the disagreeable odour for the most part disappears.

This colourization is a consequence of the strong tendency of the propylates to become oxidized, and by this to become dark. If the solution of acid propylate of the oxide of lead be treated with sulphuretted hydrogen, and the sulphuret of lead be removed, we obtain a perfectly colourless solution, which has a strong acid reaction, becomes coloured by evaporation in the water-bath, loses the very disgusting odour of train-oil, and at last leaves an intensely brown coloured residue. Exactly the same is the case with the watery solutions of the neutral propylates of baryta and ammonia. The perfectly neutral, colourless, but undecomposed solution of the ammoniacal salt smells of herrings, but that of the salt of lead smells like concentrated broth.

4. If a solution of cod-liver-oil-soap, prepared as stated in No. 3, be distilled in a suitable spacious distilling apparatus, with an addition of caustic lime and chloride of ammonium (in the proportion of six drachms hydrate of potash, three ounces of cod-liver oil, six ounces of water, six ounces of fresh burnt caustic lime, and one drachm of chloride of ammonium), with the precaution that the mixture of lime and chloride of ammonium be added to the soapy mixture previously introduced into the retort, so that the lime mixture be perfectly impregnated by the latter, the generation of hydrate of lime takes place upon the application of a slight charcoal-fire, with a rather strong heat ; at the same time a colourless liquid, clear, like water, is distilled over, and this is a *concentrated aqueous solution of propylamine*, without free ammonia. The crystallized sulphate of propylamine is easily obtained from this solution by saturating it with diluted sulphuric acid, and precipitating the resulting salt with spirit of wine.

This very simple experiment is sufficient to prove with certainty the proportion of the oxide of propyle in cod-liver oil; the propylamine possesses all the properties of that obtained from the brine of herrings or from ergot of rye.

Conclusion.—Cod-liver oil, when saponified with potash, yields oleic and margaric acids, and oxide of propyle; with oxide of lead it forms oleic and margaric acids and a pure highly oxidized matter from propyle, namely *propylic acid*. In neither case of saponification *is the hydrated oxide of glyceryle* obtained: the *glyceryle* ($C_6 H_5$) is replaced in cod-liver oil by *propyle* ($C_6 H_7$). The generation of *propylamine* ($NH_2 C_6 H_7$), on the addition of ammonia, takes place only in cod-liver oil, and in no other officinal fatty oil, and its place in the Materia Medica cannot, therefore, be supplied by any other oil.

It is not my intention to draw, from these investigations, any conclusion as to the medicinal efficacy of cod-liver oil. I am not a physician; but when we reflect that the fat assimilated by the animal organism serves chiefly as a material for the process of respiration, the possibility of cod-liver oil undergoing during this process a decomposition similar to that which it undergoes by the influence of alkalies, is very plausible ; and when we further consider that in such a decomposition, by the presence of the conditions requisite for the formation of ammonia, which, indeed, are never wanting in the animal organism, the formation of propylamine is highly probable, it is not surprising why cod-liver oil alone should prove so advantageous in many diseases, even exclusive of the slight proportion of iodine ; and I think myself justified in concluding that the efficacy of this oil depends chiefly upon the peculiar chemical composition which I have discovered; as propylamine, according to my experiments, is to be found also in the normal urine and sweat.

The importance of the small quantity of iodine contained in the oil I shall endeavour to determine by subsequent experiments ; for the present I shall only observe that both the *oxide of propyle* and the *propylamine* are chemically very closely related to iodine, the first forming with it a compound (iodide of propyle), similar to iodide of formyle (iodoform), which becomes very easily decomposed.—(Buchner's *Neues Repertorium fur Pharmacie*, Bd. I., Hft. 4., p. 165.)

ON EDIBLE EARTHS.

BY EHRENBERG.

Various kinds of edible earth were known in China in very ancient times, and it may be presumed, that many of them are mixed or pure tripolitan fresh water bioliths, *i.e.* species of earths or stones, the elements of which consist chiefly of remnants of microscopic living beings. In the year 1839, Biot read before the Academy of Sciences in Paris a treatise, containing everything that was then known on this subject, to which his son, the oriental linguist, Biot, furnished translations from Chinese and Japanese works. From Schott in Berlin, Professor Ehrenberg obtained in addition the following information taken from Chinese sources. The first mention of edible earth dates from the year 744 after Christ, and is contained in the Chinese work Pen-tsao-kang-mu, where it is called Schi-mián, Stonebread, or Mi-ánschi, Breadstone ; the article in the Japanese *Encyclopædia*, which Biot has translated, is taken from this work. The Pen-tsao says, according to Schott, that stones contain several substances which are edible, especially a yellow meal and a fatty liquid, which is contained in the white Yü (a stone) and is, therefore, called the fat, marrow, or mucilage of the white Yü. An earthy substance, prolonging life, and called Schi-naó, is found in the very smooth stone Hoa-shi, which is supposed to be

Steatite, and may, perhaps, be decomposed Steatite. The Schi-mian is only used as a substitute for bread in times of scarcity, when it is miraculously found in different localities, as is believed. The imperial annals of the Chinese have always religiously noticed its appearance, but have never given any description of the substance. The Pen-tsao quotes, under the emperor Hiuan-Tsung of the great dynasty Tang, in the third year Tian-pao (744 after Christ) a spring in Wujin (now Liang-tschen-fu, in the province Kan-su), which ejected stones, that could be prepared into bread, and were gathered and consumed by the poor. (Schott.)

Under the emperor Hian-Tsung, of the same dynasty, in the ninth year of the period Yuen-ho (809 after Christ), the stones became soft and turned into bread. (Biot.)

Under the emperor Tschin-Tsung, of the dynasty Sung, in the fifth year of the period Ta-tschong-Tsiang-fu (1012 after Christ) in the fourth month, there was a famine in Tsy-tschen (now Ki-tschen in Ping-yang-fu, in the province Schan-si), when the mountains of Hiang-ning, a district of the third rank in the same part, produced a mineral fat (Stonefat) resembling a dough, of which cakes could be made. (Schott.)

Under Jin-Tsung, in the seventh year of the period Kia-yeu (1062) stone meal was found. (Biot.)

Under Tschi-Tsung, in the third year of the period Yuen-fong (1080), the stones turned into meal. All these kinds of stone-meal were collected and consumed by the poor. (Biot.)

Very recently, in the years 1831 to 1834, similar kinds of earth have been found in China, and were used as food during the great famine, as has been reported by the Chinese missionary, Mathieu-Ly, who resides in the province Kiany-si. In the year 1834 he writes:—"Many of our Christians will surely die this year from starvation. The Almighty alone can aid them in such great distress. All harvests have been destroyed by the floods. For three years a large number of persons have lived upon the bark of an indigenous tree; others have eaten a light white earth which has been discovered in a mountain. It can only be obtained for silver, and not every one can, therefore, procure it. The people have first sold their wives, then their children, then their furniture, at last they have pulled down their houses and sold the wood. Many of them were, four years ago, wealthy men." The missionary Rameaux also reported in 1834, from the province Hu-kuang, that many Chinese Christians have sent for him to administer to them the last sacrament, and foreseeing the hour when they were to die from starvation, actually died at that very time. The very dense population and industry which necessarily takes possession of everything, are, in cases of earthquakes and deluges, the cause of these circumstances in China.

The districts where stone-bread has been found are the northern province of Schan-si, the east provinces of Schan-tong and Kiang-nan, on the mouth of the Yellow river (Huang-hu), the provinces Hu-kuang and Kiang-si, in the valley of the Blue river (Yantse-kiang). It is very desirable to know the masses, localities, extent of occurrence of these earths, as well as their geognostic character. The analysis of the two kinds, which the author has obtained, renders it very probable that all similar substances belong to antediluvian deposits, some of which are very probably tripolitan, fresh water-beoliths of infusoria, while others appear to be clay mixtures or real clays. (*Letter*).

A White Edible Earth of 1834 *from China.*—The author obtained, in the year 1841, by Humboldt, from Paris, a sample of the edible white earth, sent to Paris by the French missionary in China. One of the two pieces measured two inches in diameter, the other one inch. It has a white colour, similar to chalk, but is as light as *Kieselguhr* or Meerschaum, is somewhat fatty to the touch, not solling the fingers, but very brittle. The pieces having been broken in those directions which were indicated by a previous crack, some of the internal surfaces had a rusty colour, but only superficially. Acids caused no effervescence. According to the analysis, this earth is merely silicate of alumina, the peculiar lightness of which is striking. If heated it assumes a grey colour. In fifteen samples no organic mixture could be discovered by microscopic examination, which latter shows also no similarity between this substance and Meerschaum; there is also an entire absence of magnesia. This earth has much resemblance to lithomarge-like Kaolin, but its lightness and the different form of the microscopic parts, admit no identity between them. Irregular, mostly globular bodies of various sizes, with soft obtuse outlines, compose the whole mass. Perhaps it is a deposit of a precipitate from hot siliceous waters.

From the blackish mould left in the impressions of the smoothly scraped natural surface, it is obvious that the fossil has not been taken out from the midst of rocks, but was dug out from a black mould. Analyses have shown eighteen different microscopic forms, which are enumerated in the 294th analysis of the micro-geological researches of the author.

B. Yellow Edible Earth from China.—In the year 1847 the author obtained from one of the great geological collections in London a small sample of this earth, which from a grey passes almost into a sulphur-yellow. It resembles a very fine clay, does not soil the fingers, but is brittle, and shapeable when moistened. Acids produce no effervescence, and when heated it becomes first black, then somewhat reddish. Its microscopic elements are a rather coarse, double refracting, mostly quartz sand, surrounded by a somewhat finer mould. Intermixed are isolated, small green and white crystals, mica, and Phytolitharia, with now and then traces of Polygastric shells and silicious casts of stone kernels of Polythalamia. In ten analytical examinations were found fourteen forms: one Polygaster, nine Phytolitharia, one Polythalamium, and three crystals. The substance is therefore, according to this, a loamy or clayey substance. All the Phytolitharia contained in it are in a corroded porous state, just as they occur in antediluvian tertiary layers. The presence of Polythalamia, and in particular of Textilaria globulosa in a stratum, very likely of the interior continent, indicates chalk formations in the vicinity of the place, or at least in the aquatic district of the river. This appears to prove that the clay similar to the edible Tanah ambo in Java, which it very much resembles, is a tertiary fresh-water formation in the modern sense of geognosy, incumbent on chalk or mixed with fragments of chalk. The forms occurring in it are:—

1. Polygastria: *Trachelomonas lævis.*
2. Phytolitharia: *Lithodontium Burus, L. nasutum, L. rostratum, Lithosphæridium irregulare, Lythostylidium clavatum, L. læve, L. quadratum, L. rude, L. Trabecula.*
3. Polythalamia: *Textilaria globulosa.*
4. Inorganic forms: *green crystalline prisms, white crystalline prisms, plates of mica.*

The sum of the discovered species is eleven organic forms and three inorganic ones; among which are ten fresh-water formations and one marine formation, Textilaria.—*Pharm. Central Blatt.*, 1852, No. 4.

ON THE ENEMIES OF THE MEDICINAL LEECH.

BY DR. EBBARD.

Every year France imports leeches to the value of nearly three millions of francs, from Sardinia, Italy, and Spain, and even these countries obtain them elsewhere. In England and in America the high price of leeches almost precludes the use of them among the lower classes.

These circumstances naturally lead one to imagine, that any persons who could succeed in propagating leeches in confinement, would realize immense fortunes. Numerous trials have been made with this view, a few have not been entirely unsuccessful; but in no case that I am aware of, have the results equalled the expectations of the experimentalists.

Nevertheless, in several cases where reproduction was attempted, the first apparent results were most satisfactory; for in some pieces of water which had been properly stocked with them, and presented favourable conditions of soil, aspect, and vegetation, there appeared each year, in the months of May and September, large quantities of young leeches moving on the surface of the water. But after the lapse of a few years, with scarcely any exceptions, there remained only those which were placed in the water, and those just hatched.

What then had become of the young leeches which were seen in each of the preceding years? Had they perished from want of food, or had they suffered from an epidemic disease? Had they emigrated? Without doubt, in certain cases, the disappearance of the leeches might be attributed to the depopulation of the ponds, but more frequently it was caused by their various enemies. Animals having their freedom are not exposed to many diseases, and if they sometimes perish from want of nourishment, they more commonly are the victims of other animals. The leech forms no exception to this general rule.

Which then are the enemies of the leech? A memoir by M. Hedrich, of Dresden, the work of M. Huzard, on the breeding of leeches; that of M. Martin, the monograph by M. Moquin, and the report made to the Academy of Medicine by Pro-

fessor Soubeiran, contain some information on this question, but the information is incomplete, and insufficient for the guidance of those persons having pieces of water stocked with leeches. Therefore, I have thought it useful to publish my own notions and experience on this subject, in addition to those already made known by others. Such is the object of this notice, in which I propose, first, to describe the enemies of the leeches, known and unknown; secondly, to point out a means of diminishing, if not of preventing, their ravages.

Quadrupeds.—Pigs devour leeches. On the edge of a pond, in which I had some considerable number of leeches, I observed that the pigs were turning over the ground, from which the water had just receded, or sometimes it was covered by a few centimètres of liquid. A great portion of this ground was without the least vegetable production; for what, therefore, could these animals be seeking, unless it were for aquatic animals buried in the mud? On the same day, I threw some leeches to the pigs, who devoured them with that greediness which is proverbial with these animals.

The otter, the hedgehog, and the mole, have been mentioned by leech-gatherers, as being enemies of the leech.

M. Joseph Martin has found leeches in the stomachs of rats and water shrew-mice. These animals are most prejudicial, as they destroy the cocoons which the leeches deposit in the holes formed by them.

Birds.—"A cultivator in Sologne," says Paymaurin, "having realized 30,000 francs in four years by commerce in leeches, tried to breed them in a small pond. He put in more than 200,000, when several flocks of ducks took possession of the pond, and depopulated it in twenty-four hours."

This fact is at the least exaggerated; for had the pond been covered for several days by millions of ducks, these birds could not have caused so considerable a loss, as leeches remain in large numbers buried in the earth. However it may be, I consider it as certain that ducks are very fond of leeches. At a farm of Dombe's, where I had been called in, the leeches which had been applied to a sick person were crawling before the door of the house on some muddy soil. The ducks seized them with avidity and swallowed them, after having washed and shaken them in an adjacent pool.

It is probable that teal, ducks, and other palmipedes (I except the domestic goose) are enemies to the leech. This supposition is equally applicable to the heron and other wading birds. A young bittern or pouch, which I reared in 1850, much preferred fish or frogs to leeches, but ate the latter when deprived of other food. Geese have never eaten the leeches I have offered them, neither do they eat frogs and water-lizards.

The fowl is also an enemy of the leech. I was occupied in cleaning a jar containing leeches before a window from which the crumbs from the table were usually thrown into the yard. A number of chickens came under the window and I threw them some leeches, which they quickly swallowed, and notwithstanding the fears of the farmer's wife, continued in good health.

Reptiles and Batrachia.—From birds I pass to reptiles and batrachians, and my attention will be first directed to the water-adder, the head of which is so often seen above the water of ponds. It eats leeches, although they are not a favourite food with it. One of these pretty reptiles, which I kept under a wire-gauze cover, swallowed a frog or a salamander every three or four days; but it would not take leeches until after a week's fasting. But although it devours frogs and salamanders, which serve as nourishment to the leech, yet the water-adder must be considered as an injurious animal.

I had seen terrestrial toads swallow worms, and I therefore imagined they would do the same with other kinds of annelides. But one of these animals, which I confined with some leeches, died without having touched one of them.* Should I have concluded from this fact that toads do not eat leeches? Not at all. The loss of liberty is with some animals the cause of so much sorrow, that they will allow themselves to die of hunger. I had recourse to another means of testing this fact. I watched for the appearance of a toad, who had domiciled himself in a hole in the house, and then threw him a leech; it instantly disappeared.

Doubtless there exists a great similitude of conformation and habits between the terrestrial and aquatic toad; it might, therefore, be imagined that the latter would

* Leeches attach themselves to toads without biting them.

also eat the leech. My experiments have given me proof to the contrary. Several aquatic toads, which I placed in a glass jar, seized with avidity some earth-worms, but would never touch the leeches which I offered them. Ten toads which I opened contained only non-aquatic insects.

Aquatic toads, salamanders, and frogs, are bitten by leeches, who feed on their blood;* they have, therefore, been recommended as useful in leech-ponds. But if these annelides were devoured by water-lizards or frogs, it would be introducing the wolf into the sheep-fold. From thence to my experiments on batrachia. I have stated all relating to the toad, and I will now state the facts I have obtained relative to water-lizards and frogs.

Some water-lizards which I kept in a jar, having become sufficiently tame to take worms out of my fingers, fled instantly to the opposite side of the jar when I offered them some young leeches. A leech-gatherer assured me he had seen a frog swallow a leech. This circumstance is not improbable, as the frog is very carnivorous; the frog, as is known, is caught by means of a fish-hook baited with the skin of another frog. Nevertheless, several frogs, which I had kept without food for some days, would never touch leeches, either when in the water or on its surface; they, on the contrary, seized on worms of the same size, which I had placed with the leeches. Twelve frogs, taken out of a swamp stocked with leeches, were found to contain, when opened, only beetles, spiders, and flies. Although aquatic toads, salamanders, and frogs, are not enemies of the leech, yet I have made known my experiments relative to them, as my silence respecting them might have appeared to be the result of an omission.

Crustacea.—M. Demarquette, of Douai, informed me that the animal which caused the greatest ravages among leeches was known in that country by the name of *scorpion*. At Bresse this name is given to the fresh-water shrimp. Wishing to convince myself if this was the animal alluded to by M. Demarquette, I plunged a small leech into a stream where these crustaceæ were numerous; it was instantly surrounded on all sides, and when I withdrew it from the water its body was covered with wounds.

In the month of April, 1850, Professor Soubeiran erected a reservoir for leeches in the central Pharmacie of the hospitals of Paris, with the view of studying the reproduction of these animals. At the end of the year, on examining the contents of the reservoir, he only found about a hundred fillets, but instead of them he found a large quantity of the *oniscus aquaticus*. M. Soubeiran, jun., suspecting that these crustaceæ were enemies of the leech, placed a number of them in a jar with leeches; they soon attached themselves to the bodies of the latter, who tried without effect to get rid of them, but ultimately became their victims.

The *oniscus aquaticus* are very numerous in the ponds in the neighbourhood of Paris. M. Soubeiran thinks that this circumstance explains an observation frequently made by dealers in leeches. "Frequently," they say, "they have seen in their ponds the young leeches produced by the adults which they had placed there; but in all cases after a short time this hope of a new generation completely disappeared."

As will be perceived, this opinion of M. Soubeiran's much resembles that entertained by myself, and which induced me to write this memoir.

The *oniscus aquaticus* of Linnæus only differs from other lice in the form of its tail. The body is flat, composed of eight rings, including the tail. The head is broader than it is long. The seven crustaceous laminæ which cover the body are almost equal, but the eighth, which forms the tail, is larger, rounded, and terminates above in a blunt point; it is furnished on each side with forked appendages attached to its extremity, and terminating in four long bristles. The *oniscus aquaticus* has seven pairs of claws.

It is probable that those aquatic lice, which are of the same size and the same habit as the *oniscus aquaticus*, such as the *branchia*, also devour the leech. The *branchia* has a long body, and is yellow and transparent. Its head is furnished with two immoderately long horns, forked at the points. The eyes are very large, black, and *fixed on a moveable neck*. The tail is terminated by two fins furnished with long feathered webs.—*Journal de Pharmacie.*

* The contrary has been said relative to toads, but I am certain of the fact above stated.

PREPARATION OF PROPYLAMINE FROM ERGOTINE.

BY DR. F. L. WINCKLER.

THE readers of the *New Repertory for Pharmacy*, part i., p. 22, already know that I have been for some time occupied with the investigation of ergot, and that I obtained, by the distillation of ergotine with potash, besides ammonia, a substance having a very unpleasant odour, which conducted itself as a volatile alkali, and possessed a narcotic and highly diuretic property. This confirmation of a result which I had obtained some years before, induced me to continue my experiments, and I have now arrived at the conviction that the volatile alkali which is extracted from ergotine by distillation with potash is propylamine ($NH_2 C_6 H_7$, or $NH_2 C_3 H_7$), consequently the same which, according to the most recent experiments, is proved to be the product of decomposition of narcotine by potash, and the ingredient of herring-pickle. The smell itself made me imagine, long before I was acquainted with Wertheim's experiments, that herring-pickle must likewise contain propylamine, and my experiments have fully confirmed this supposition, for in distilling herring-pickle with potash I obtained the same propylamine as that extracted from a concentrated aqueous solution of ergotine. The properties in which they agree are the following:—

1. Propylamine saturates acids completely, and thus forms salts soluble in water, and for the most part in spirit of wine, with the exception of sulphate of propylamine, which does not dissolve in the latter. Beautiful white crystals may, however, be produced from the concentrated aqueous solution by the admixture of alcohol of eighty per cent. of strength. The salts of propylamine dissolved in water and treated with tannic acid, produce a white (flocculent) precipitate; with chloride of mercury likewise a white but pulverulent precipitate; with nitrate of silver a white (flocculent) precipitate; and with chloride of platinum a yellow precipitate (a crystalline powder). The salts of propylamine have a strong odour of fresh ergot, much less of herring-pickle, and are easily decomposed by potash.

2. The concentrated aqueous solution being mixed with a fourth of its volume of tincture of iodine, a considerable dark yellowish-brown sediment is precipitated, and the supernatant fluid appears dark brownish-red. But in a very short time this sediment diminishes considerably, the fluid gradually changes colour, so that in about twelve hours' time there will be left but very little orange-coloured sediment, whilst the fluid itself will appear almost colourless. Immediately after the addition of iodine the very disagreeable odour of propylamine disappears, and the mixture acquires the odour of iodine.

3. When the neutral aqueous solution of sulphate of propylamine is evaporated in a water-bath it exhales a very disagreeable odour of herring, the solution becomes very acid, has only a weak odour of ergot, and all the reactions cease. If this concentrated solution be digested with caustic lime in a still, there comes over, without the aid of artificial heat, almost pure propylamine, which has the odour of an ammoniacal liquid, and produces all the reactions of pure propylamine.

Now the propylamine of ergot presents the very same results, and it is on this account that until lately it has always been mistaken for ammonia. I am convinced that it constitutes the odorous principle of urine, perspiration, and in the blood, and is often the cause of the odour which we observe in the action of alkaline lyes upon nitrogenous compounds. Propylamine belongs to the organic bases, and may be considered as the adjunct [*Paarling*] of ammonia. I think I am justified in concluding, from the results of my experiments, that propylamine, *combined with an acid*, pre-exists in ergot as well as in herring-pickle, and is not produced by the potash, as is the case with narcotine. I have previously demonstrated the presence of formic acid in ergot, and it is with that acid that the propylamine seems to be united. I have not yet made any experiments with herring-pickle.

It will not now be difficult to determine whether the medicinal activity of ergot depends on propylamine or not, for the neutral salts of propylamine dissolved in water are easily absorbed, and I hope to be able to induce physicians to make pharmacological and therapeutical experiments.

I have reasons to suppose that propylamine is likewise an ingredient of cod-liver oil, and being easily combined with iodine, it may be soon ascertained by practical application whether it ought not to be considered as the bearer (*träger*) of iodine. I propose to begin the necessary experiments in this respect as soon as my apparatus is entirely free from the odour of propylamine, in order to avoid all error.

Finally, I had the idea of trying an experiment with regard to propylamine upon my own urine, which I made after a supper consisting of roast veal, potato-salad, and a glass of water, and which was neither acid nor alkaline. I poured three ounces of the urine, fresh made and still quite warm, upon four ounces of burned lime, and submitted it to distillation. The distilled product had indeed the odour of pure propylamine, and reacted strongly alkaline; but acted in a remarkable manner on tincture of iodine in the same way as liquid ammonia. After having neutralized it with sulphuric acid, the liquid showed, when tested with tannic acid and nitrate of silver, an unmistakable proportion of propylamine. Might this be formed out of the urea? My experiment confirms, at all events, the opinion stated above; the beginning is made, and I may now pass from experiment to scientific deductions.

Remarks by Dr. Buchner.—My friend, Dr. Winckler, in communicating the above paper, very agreeably surprised me by transmitting at the same time specimens of his preparations of propylamine, and that too in quantities varying from one to two drachms, for which I hereby beg to express to him publicly my best thanks. I received from him, namely:—

1. The rough product of distillation of herring-pickle.
2. The aqueous solution of the sulphate produced from it.
3. The pure crystallized and by spirit of wine precipitated sulphate of propylamine.
4. The concentrated solution of pure propylamine.
5. The aqueous solution of the sulphate prepared with No. 4.

Hitherto I have only experimented with the preparations No. 2, 4, and 5, in order to verify and complete the statements of the above paper. All these solutions are quite colourless and clear, like water; they diffuse already at some distance a strong odour of herring; but the pure aqueous propylamine, when smelt at closely, has a pungent odour, very similar to that of liquid ammonia, which, however, at a distance assumes, as it has been said, the smell of herring. This odour is so peculiarly characteristic, that I do not doubt, that even in water-closets, in consequence of fermentation, propylamine is developed, particularly as woollen clothes easily acquire there the odour of herring. All the conditions at least necessary for the formation of propylamine, ammonia, and carbo-hydrogen, are to be found in water-closets. In a small close room its odour becomes insupportable, and affects strongly the head. Doctor Winckler had, therefore, good reasons to warn me against it. A young Chemist, upon whose hand I dropped a very minute quantity of aqueous propylamine, for the purpose of ascertaining its taste, notwithstanding that he had been walking after that a considerable distance, and had been exposed to the air, smelt still, after some hours, so strongly of herring, that happening to enter a company, he was spoken to about it by several persons. I mention this merely as a caution. The taste of pure aqueous propylamine is pungently alkaline, and hardly distinguishable from that of caustic ammonia.

The chemical reactions of propylamine are well explained by Winckler Turmeric paper turns brown with it, but being exposed to the air, in which propylamine quickly evaporates, it resumes again its primitive yellow colour.

Sulphate of propylamine (No. 3) appears in small splendid white prisms; exposed to the air it evolves a distinct smell of herring, and has a pungent saline taste, like sulphate of ammonia; it is entirely neutral, and when moistened with water, it does not alter the colour either of blue or red litmus-paper, or of turmeric-paper.

We have in solutions of silver and iodine, which are not precipitated by ammonia, very appropriate re-agents for distinguishing propylamine from ammonia. Propylamine, however, treated with sulphate of silver, gave me not a white, but a yellowish-brown precipitate; and this result suggested to me the idea, that formiate of propylamine might be present. This precipitate was easily and perfectly dissolved in caustic liquid ammonia. With an aqueous solution of iodine I acquired at one time, according to the quantitative proportion, a brown, and at another time a beautiful yellow precipitate, which dissolved in an excess of iodide of potassium. I usually employ an aqueous solution of iodine in iodide of potassium, instead of the tincture of iodine made with spirit of wine. The precipitate produced by iodide of potassium is, as I have just stated, either brown or yellow, provided that no excess of iodide of potassium be employed.—*Buchner's Neues Repertorium*, Bd. 1.

PREPARATION OF NITRO-PRUSSIATE OF SODA.

BY M. Z. ROUSSIN.

Dr. Lyon Playfair, after having discovered the nitro-prussic combinations, was led from the study of their reactions to propose the employment of nitro-prussiate of soda as a test for the alkaline sulphurets. There are, in fact, but few tests so sensitive as this. The reaction which accompanies the purple-violet colour developed by the test, is not sufficiently understood to admit of a satisfactory explanation being given. The elementary composition even of the nitro-prussiate of soda, and the theory of its formation, cannot be said to have been unquestionably determined. My attention having been directed to the preparation of this salt according to Dr. Playfair's process, and also according to that equally complex of Schlomberger, I have been led to adopt the following simplification of the process:—

One part of ferrocyanide of potassium in powder is added to two parts of commercial nitric acid, diluted with an equal volume of water. The mixture, contained in a porcelain dish, is exposed to the heat of a water-bath, and is constantly agitated to promote the reaction which is accompanied by the disengagement of much gas, and especially of hydrocyanic acid.

The decomposition is thus slowly effected, and when no more gas is given off, the liquid is to be exactly neutralized with carbonate of soda, whilst it is still maintained at the same temperature. An ochreous precipitate now separates, and afterwards, on continuing the evaporation, white crystals appear on the surface of the liquid, while at the same time a smell of ammonia is developed. There is to be now added to the liquid an equal volume of rectified spirit. The mixture is to be heated to the boiling point, and then thrown on to a filter. The deposited salt is to be washed with a little spirit, and the filtered liquor submitted to spontaneous evaporation. Regular prisms, of a ruby-red colour, consisting of nitro-prussiate of soda, will be speedily deposited. When the crystallization has proceeded for some time, the crystals are to be separated and dried. The mother-liquor will now yield crystals of nitrate of potash and of soda, and the nitro-prussiate must be separated from these by treating the mixed salts with proof spirit at a boiling temperature, when a further crop of crystals, as pure as the first, may be obtained.—*Journal de Chimie Médicale.*

ON THE ASSAFŒTIDA PLANT.

BY F. A. BUHSE.

The author tells us that the mode of collecting assafœtida, which is now in use (in 1848), is exactly the same as that described by Kaempfer 160 years ago. He regards the plant as a species of *Ferula*, but he does not appear to have met with the plant in flower, as he describes the radical leaves only as they appeared in April, when the dry stems of the previous year were from three to five feet high.—*Central Blatt.*, 1852, No. xiii., p. 207.

NEW METHOD OF EFFECTING CRYSTALLIZATION.

BY M. PATEN.

Having observed the phenomena of the crystallization of sulphur on the surface of vulcanized India Rubber, in which case it appears to pass in solution from the interior of the mass and to be deposited there in consequence of the evaporation of the solvent, I was induced to seek the means of increasing the size and regularity of the crystals obtained from different substances, and especially those of little solubility.

I have attained this object by a simple arrangement of apparatus, through which a liquid circulates which, in one part, dissolves the substance to be crystallized, and in another and cooler part, deposits it in a crystalline state. The apparatus consists of a flask or tubulated receiver, surmounted by another vessel of a similar kind, the necks of which are connected, and the lateral openings of which communicate by tubes, the one with the top and the other with the bottom of a vessel placed at some distance. The inverted receivers are both filled with the substance to be dissolved, and the whole of the apparatus with the solvent. Heat derived from a constant and uniform source is applied to the receivers, by which a continued circulation of the liquid is maintained, and this being saturated in the most heated part of the apparatus, is conveyed to the cooler part where the deposition takes place.

Crystallization may thus be made to take place slowly and regularly, so as to produce crystals of considerable size, even from slightly soluble substances. By using benzole and sulphur, I have been enabled in this way to obtain crystals a hundred times larger than those formed in the usual way.—*Comptes Rendus.*

GINGER WINE.

In answer to a Correspondent, who asks for a formula for Ginger Wine, we insert the following from *Robinson's Art of making British Wines*:—"Boil sixty-five gallons of river water, one and a half cwt. of the best loaf sugar, and five lbs. of the best race ginger, bruised, half an hour; then add the whites of ten eggs, beaten to a froth with two ounces of dissolved isinglass, stir it well in, and boil twenty minutes longer, skimming it the whole time. Then add the thin rinds of fifty lemons, boiling them ten minutes more. Cut twenty-eight lbs. of good Malaga raisins in half, take away the stones and stalks, and put them with the juice of the lemons strained, into the hogshead. Strain the hot liquor into a cooler, and when it has stood two hours and is settled, draw it off the lees clear, and put it into the cask, filter the thick and fill up with it. Leave the bung out, and when at the proper temperature, stir three quarts of thick fresh ale yeast well into it; put on the bung lightly, and let it ferment six or seven days, filling up with liquor as it works over. When the fermentation has ceased, pour in six quarts of French brandy, and eight ounces of the best isinglass, dissolved in a gallon of the wine; then secure the bung effectually, and paste paper over it, &c., &c. Keep it two years in a cool cellar, then bottle it, using the best corks, and sealing them, and when it is four years old commence using it."

CHEMICAL SOCIETY.

June 7th, 1852.

COLONEL PHILIP YORKE, VICE-PRESIDENT, IN THE CHAIR.

NOTE ON THE EXISTENCE OF STRONTIA IN THE WELL-WATERS OF BRISTOL.

BY WILLIAM AND THORNTON J. HERAPATH.

The attention of the authors was first directed to this subject in consequence of the discovery of a small quantity of sulphate of strontia in the deposit found in a water-pipe. On carefully examining the well-waters, from different parts of the city and its suburbs, sulphate of strontia was found, to a greater or smaller extent, in most of them. The method adopted for the detection of this ingredient was, to evaporate the water to dryness; to treat the residue with pure sulphuric acid, driving off the excess of acid by heat; then to treat first, with boiling water, and subsequently with hot hydrochloric acid, until everything soluble in these menstrua was removed, leaving the sulphate of strontia together with silica. In order to separate these two substances, they were exposed in a platinum crucible to the vapour of hydrofluoric acid, by which means the silica was abstracted, and the sulphate of strontia left.

ON A NEW METHOD FOR THE ANALYSIS OF CHROME ORES, AND ON COMMERCIAL CHLOROCHROMATE OF SODA.

BY F. C. CALVERT.

For the method usually adopted for the analysis of chrome ores, the author proposes to substitute the following:—The ore, well pulverized, is mixed with about three or four times its weight of a mixture made by slaking quick-lime with caustic soda, and then drying and calcining the mass. To these about one-fourth part of nitrate of soda is added, and the mixture is calcined for about two hours. By this method one treatment is generally sufficient to convert the chromium into chromic acid, whereas by the usual method five or six successive calcinations are required.

Another process, which he has also found to produce good results, consists in calcining the pulverized chrome ore with nitrate of baryta, adding a little caustic potash from time to time towards the end of the process.

Commercial chlorochromate of soda was found by analysis to contain chromic acid, chlorine, sulphuric acid, potash, and soda. The author assigns to it the following composition:—

Bichromate of potash	23.16
Chlorochromate of soda	17.33
Chloride of sodium	33.71
Sulphate of soda	25.66
Insoluble matter	.21
	100.07

ON CERTAIN ISOMERIC TRANSFORMATIONS OF FATS.

BY PATRICK DUFFY.

A great number of observations are recorded in this paper, showing that stearine and some other fats may be obtained in different allotropic conditions in which they have different melting points.

ON THE QUALITATIVE SEPARATION OF ARSENIC, TIN, AND ANTIMONY.

BY GEORGE F. ANSELL.

The method proposed by the author consists in dissolving the mixed sulphides in nitro-hydrochloric acid, and pouring the solution into an apparatus in which hydrogen gas is generated in the usual way. The evolved gases are first passed through a wash-bottle containing solution of acetate of lead, to remove any hydrochloric acid or sulphuretted hydrogen, and are then conveyed into a test-tube half filled with strong nitric acid. The nitric acid solution obtained after the gases have passed for about a quarter of an hour, is evaporated to dryness, and the residue, which will contain the arsenic originally present partly in the state of arsenic and partly of arsenious acid, and the antimony in the state of antimonic acid, is exhausted with warm water, which takes up the first two and leaves the last-named substances. The tin remains in the vessel in which the hydrogen was generated. These are severally identified by the application of the appropriate tests.

ON THE EAU MEDICINALE D'HUSSON.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Palmam qui meruit, ferat.

Sir,—In your Journal for April appeared a letter from Thomas Bushell, Esq., on the Basis of the Eau Medicinale d'Husson. I am induced to reply to this letter as an act of justice to a departed friend. We are indebted to the late Charles Thomas Haden, Surgeon, who, during the latter part of his life resided in Sloane Street, for the re-introduction of colchicum into practice for the cure of gout, rheumatism, and pure inflammatory diseases; and most certainly not to Mr. Want, as the narration of the following facts will show.

In the year 1811 Mr. C. T. Haden was residing and practising in Derby, with his father, who was an eminent Surgeon of that town, and a patient of his was very desirous of trying the Eau Medicinale d'Husson for the relief of gout. This remedy was procured and taken, and its effects appeared almost miraculous; the relief from pain was so instantaneous as greatly to excite our curiosity. Mr. C. T. Haden, who had been accustomed to dispense medicines for his father from his boyhood, was well acquainted with the smell and taste of drugs. And although there was at that time in the Pharmacopœias only one preparation of colchicum (the oximel), and that but seldom used, and then only considered as a diuretic, yet the acuteness of his senses and his judgment induced him to believe the principal ingredient of the eau medicinale to be colchicum. This idea occurred to him suddenly while engaged in the performance of music. He turned to me during a short rest, and said, "Upon my life, I believe that stuff is nothing but colchicum." We immediately commenced our experiments with a saturated tincture of colchicum made with lbss. of the recent bulb macerated in a lbj. of proof spirit. We were very soon convinced of the identity of the colchicum and the principal ingredient of the eau medicinale. Our attention was next turned to the best method of making a powder of the bulb without injuring the narcotic powers of the drug. To obtain the remedy with its full narcotic power, the bulb must be collected *while its vital powers are in their most active state*, that is, just before the flower is blown, when the flowering leaf is fully up. This will be about the beginning of July. The time will, of course, vary with the climate of the locality.

The outer skin must be removed, and the cormus cut into thin slices and dried at a temperature *not exceeding* 120° Fah. It is safer to dry them in the sun, for a *high temperature dissipates, or greatly reduces the narcotic power* of the drug. As the efficacy of this remedy depends upon these two circumstances, *i.e.*, the proper time of collecting the cormus and the careful temperature in drying it; and as these points are either not understood or are disregarded, the remedy is fast falling again into disuse. A tincture and a powder made and collected strictly by these directions, may always be relied upon as effective remedies; and this is the time of the year that these hints may be useful.

In or about the year 1812, Mr. C. T. Haden left Derby and settled in Sloane Street, London, where he commenced the publication of a periodical work called the *Medical Intelligencer*. He was appointed a medical officer of the Brompton Dispensary where he introduced the colchicum into practice, and it was here that Mr. Want became acquainted with it; and I well recollect the annoyance Mr. Haden and his friends felt at Mr. Want publishing a paper in one of the periodicals of the day forestalling Mr. Haden's work on colchicum. Mr. Haden not long afterwards died from an aneurism of the right subclavian artery, when the *Medical Intelligencer* died with him, and the *Lancet* had its birth.

It is with great reluctance that I have been induced to interfere in an affair for which I have no taste. Two points, however, may be gained by it; the one is, the posthumous fame of a most amiable and highly talented professional friend may be defended from literary petty larceny, and the other may be the means of obtaining a more efficient and a more powerful remedy, which, when judiciously used, may protect suffering humanity from premature death.

Geo. Wallis, M.D.,
Senior Physician of the Bristol Royal Infirmary.

Bristol, June 14th, 1852.

BOOKS RECEIVED.

The London Dispensatory; *a Practical Synopsis of Materia Medica, Pharmacy, and Therapeutics*. Illustrated with many useful tables, and woodcuts of the Pharmaceutical apparatus. By the late Anthony Todd Thomson, M.D., F.L.S., &c. &c. Eleventh edition. Edited by Alfred Baring Garrod, M.D., &c. &c. London: Longman, Brown, Green, and Longmans. 1852. 8vo, pp. 1230.

Homœopathy and the Homœopaths. By J. Stevenson Bushman, M.D., &c. &c. London: John Churchill, Princes Street, Soho. 1852. 8vo, pp. 214.

A Practical Treatise on Diseases of the Skin. By J. Moore Neligan, M.D., M.R.I.A., &c. &c. Dublin: Fannin and Co., Grafton Street; London: Longman and Co.; Edinburgh: Maclachlan, Stewart, and Co. 1852. 8vo, pp. 439.

On the Anatomy and Physiology of the Male Urethra; *and on the Pathology of Strictures of that Canal*. By Henry Hancock, F.R.C.S., &c. &c. London: Highley and Son, 32, Fleet Street. 1852. 8vo, pp. 86.

On the Nature and Causes of Fever, *especially that termed Yellow Fever*. By Edward Bascombe, M.D. London: John Churchill, Princes Street, Soho, 1852.

TO CORRESPONDENTS.

DECOMPOSITION OF NITRATE OF POTASH BY INFUSION OF SENNA.

Sir,—If nitrate of potash be added to infusion of senna, say one grain to ℥j, the bottles filled, corked, and kept under water for a week or two, nitrous fumes will be evolved immediately the cork is withdrawn, as will be evident on applying the bottle to the nose. It rapidly goes off, and the infusion remains as active, and of as fresh flavour as the day it was made. It may be kept in this manner for any length of time. I have just opened a bottle, which has been kept in this manner for upwards of a year. Ajax.

[The use of nitrate of potash, for preserving infusion of senna, was suggested some years ago by Mr. Squire.—Ed.]

Z. (Berwick).—The compound formed by adding sulphuric acid to bone-dust, would contain superphosphate of lime and sulphate of lime.

Quæster.—(1.) The colocynth fruit referred to was probably unpeeled Mogadore colocynth.—(2.) We know of no better mode of reducing camphor to powder than by the means of spirit.—(3.) We think the London Druggists generally are anxious for their Apprentices and Assistants to participate, as far as practicable, in the benefits of the Society.

C. A. (Stamford), will, on reference to the London Pharmacopœia, see that *powdered* opium is ordered in the preparation of tinctura opii. In the Edinburgh Pharmacopœia it is ordered to be sliced, and in the Dublin coarsely powdered.

J. F. wishes to know the cause of, and a remedy to prevent, the gelatinous appearance of the sweetened nitrated soda water, which has been prepared by the usual soda water apparatus (upwards of six months since), containing sesquicarbonate of soda, nitrate of potass, syrup flavoured with essence of lemon, carbonic acid, and water. We can give no other explanation than that contained in vol. i., pages 229 and 387.

A. P. S. (Wolverhampton).—(1.) "White oils," R yolks of two eggs, 3oz. solution of ammonia, 1oz. oil of origanum, 4oz. turpentine, a pint of vinegar; mix, s.a.—(2.) Arsenic with sugar was sometimes used as a fly-poison prior to the passing of the Arsenic Act.

A Member.—"Alum. rupel." is common alum coloured with Venetian red or Armenian bole. The first question is answered in another part of this Journal.

A Subscriber.—(1.) The Arsenic Act was not, we believe, intended to prevent the sale of arsenic mixed with soft soap; but the Act, if literally interpreted, prohibits such sale in less quantities than 10lbs.—(2.) The terms cyanide and cyanuret are synonymous.—(3.) Fownes's *Manual of Chemistry.*—(4.) See vol. v., page 134.—(5.) We are not aware that the work mentioned will shortly appear.—(6.) No.

G. B.—We know of no work on the manufacture of colours. Our Correspondent will find some information on the subject in Stoeckhardt's paper on Pigments, in the *Pharmaceutical Journal*, vol. vi.

G. W. R. (Margate).—No.

Mr. Stuart's communication has been received.

If "*Chemicus*" had given his name (either confidentially or otherwise), we should have published his letter.

Chemicus (Llanelly).—The Pharmacy Act will not interfere with Assistants of the present time in regard to commencing business as Chemists and Druggists; but if they desire to join the Society, or to assume the title of "Pharmaceutical Chemist," they must pass an examination.

A Subscriber (Denham).—We never recommend works on the practice of physic, but refer those who wish to become doctors to the medical schools.

An Assistant (June 18) should communicate with Mr. Redwood, the professor of Pharmacy, at 17, Bloomsbury Square.

J. B. (Hoxton).—Essence of pine-apple. See vol. iv., p. 95, and vol. xi., p. 214.

A Member (Wolverhampton).—We will endeavour to supply the information required in a subsequent number.

G. P. R.—We know of no method of depriving castor oil of its taste and smell.

M. P. S. (Manchester).—Bromide of lime is made by neutralizing hydrobromic acid with lime or carbonate of lime.

M. P. S. (Birmingham).—We believe nothing more has been published on the syrup of bark. We have not been able to find the article referred to, in the *Medical Gazette*. Perhaps our Correspondent can supply a more specific reference.

E. R. S.—See vol. xii., page 181, of this journal.

C. O. A.—Cinnabar of antimony is vermillion.

G. D., M.D.—The article is too medical for this journal.

ERRATA IN VOL. XI., No. 12.

In page 568, line 9 from bottom, *for* existing, *read* exciting.
" 569, " 9 from top, *for* mercury two parts, *read* mercury *ten* parts.
" " " 15 from bottom, *for* have, *read* I have.
" " " 18, *for* that, *read* this.
" " " 29, *for* strange, *read* strong.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. CHURCHILL, Princes Street, Soho. Other communications to the Editor.

THE PHARMACEUTICAL JOURNAL.

VOL. XII.—No. II.—AUGUST 1st, 1852.

THE MODUS OPERANDI OF THE PHARMACY ACT.

DURING the course of the proceedings which have led to the passing of the Pharmacy Act, we have from time to time reported progress, and endeavoured to give a full and unbiassed exposition of the several alterations and amendments, with their probable influence on the result. We have never disguised our disappointment at the mutilations to which the original Bill was subjected, or withheld from our readers any information which could assist them in arriving at a correct appreciation of its merits and demerits. The alternations of hope and fear, the striving against ancient prejudices, and the conflict of opposing interests, are now at an end. The Bill has become an Act of Parliament, and, such as it is, we must make the best of it.

Although the Act differs widely from that which was originally contemplated, although it does not prohibit unregistered Chemists from carrying on the business, although it has on this account been undervalued by some persons, yet we have no hesitation in expressing the opinion that it confers upon the Pharmaceutical Society a power and an influence which, if judiciously exercised, will be productive of much benefit.

The legislature has now recognised a class of persons as the representatives of Pharmacy in this country with a distinctive title, and prohibited the unauthorised assumption of that title under a penalty. The Pharmaceutical Society is the depository of the powers conferred by the Act, the Members are the parties recognised, and the fraudulent assumption or exhibition of a sign denoting membership is punishable as a misdemeanour.

If the Society had not been considered worthy of confidence, if its objects and proceedings had not entitled it to respect, it would not have been adopted as the instrument for carrying into effect the provisions of the Act. If the distinctive title denoting connection with the Society were of no value or importance, it would have been useless, and in fact absurd, to inflict a penalty for the unauthorised assumption of such title.

What then is the ground of confidence in the Society? and what is the value of the distinctive title? To answer the first question it is only necessary to refer to the reports of the proceedings of the Society contained in eleven volumes of this journal—the scientific meetings, the arrangements for promoting education, the examinations, and the persevering endeavours to raise the character and status of the Pharmaceutical Chemist. These are the sources of the prosperity of the Society and the grounds upon which it has acquired its present position.

The value of the distinction conferred upon the Members will depend entirely upon the Pharmaceutical Chemists themselves. It would be a fatal mistake to suppose that, because an Act of Parliament has been carried, nothing remains to be done. The Act may encourage and stimulate, it may promote the advancement of the art and science of Pharmacy, and raise the character of those who come within its influence: it points out the road to distinction and provides the locomotive engine, but those who desire to share the advantage must put on the steam. Education is an individual work. The character of the Society is founded on the improved education which it indicates. The value of the distinction is founded on the character of the Society, and consequently it is only by sustaining and improving the character of the Society that the full benefit of the Act can be secured.

How then is this to be effected? In the first place it is desirable to extend the basis of the Society. This may be done in accordance with the provisions of the Charter, by the election of such Chemists as may be duly certified to have been in business prior to the date of the Charter, and to be qualified for admission. It is also of the highest importance to encourage Apprentices and

Assistants to come up for examination, and it may be expected that every new Member will add his influence to that of his brethren in promoting this desirable object. The result of this united effort will be, that under the designation of Pharmaceutist or Pharmaceutical Chemist, will be included all those who are on a par with the original Members—"*omnes homines ejusdem facultatis*"—who have acquired the distinction by virtue of their standing in the business before the date of the Charter, and all the young men whose laudable ambition has prompted them to secure, by passing the examination, the double advantage of the qualification required by the Act, and the distinction belonging to it. In the course of a few years the boundary line between the regularly educated Pharmaceutical Chemist and the unqualified dealer in medicines will be clearly defined and recognised, the public will understand the distinction, and that which was originally an honorary title, will become a source of substantial advantage.

There is a feature in the Act which is deserving of remark: it contains no exemptions. The original Bill was so framed that it restricted unregistered persons from assuming any name, title, sign, or emblem, implying qualification in Pharmacy. It was therefore necessary to exempt from its operation, partially or absolutely, certain classes of persons whose legitimate profession or trade might have been materially interfered with. Accordingly, medical practitioners were absolutely exempted, and drysalters, patent medicine vendors, and the vendors of drugs used for other than medicinal purposes, were excluded from the operation of the Act so far as was necessary to enable them to carry on their trades provided they did not assume any name, &c., implying registration.

The parties above referred to are not directly affected by the Act in its present form, but a specific title is established, denoting a particular qualification, and restricted to those who are registered as the Act directs. The qualification may be superior or it may be inferior to that of the Apothecary, but it possesses this distinction, that it is a *Pharmaceutical* and not a *medical* or *mixed* qualification. While it is founded on the principle of the division of labour, it allows free competition between the two classes, but each class must sail under its own colours, and find its level in the estimation of the public.

The drysalters and others who were partially exempted under the original Bill are not interfered with by the present Act, but will no longer be confounded with qualified Pharmaceutical Chemists when the Act has come into complete operation. The time at which this is to take place must be settled by the common consent of those who are registered, or have a claim to registration, as Pharmaceutical Chemists. If all should avail themselves of the opportunity afforded, the line of separation may be established without delay, the numerical strength of the Society will ensure its stability, and its scientific character will rise from year to year as the number of Members admitted by examination increases. If, however, the Members of the Society should relax in their zeal, and if those who ought to identify themselves with the movement should be indifferent and inactive, a longer time will be required to realize the desired result, and years may elapse before the Pharmaceutical body in this country acquires the creditable and recognised status which is now offered by Act of Parliament, and which will entitle its Members to the confidence of the profession and the public.

PHARMACEUTICAL EDUCATION.

After all the doubts and fears, the discussions and arguments *pro* and *con*, respecting the educational functions of the Pharmaceutical Society, the Pharmacy Act leaves the question where it was. The Act makes no allusion to the School of Pharmacy. It neither prohibits nor enforces its continuance.

It was proved before the Select Committee that the School was not carried on as a source of revenue, but had for many years entailed a heavy expense upon the Society. The items of receipt and expenditure were handed in by the Secretary and printed in the evidence, with all the particulars relating to

the curriculum of education, the arrangements of the establishment, and the number of students in the several classes. The object for which the School had been founded was clearly stated, and the question was raised by one of the witnesses, whether an examining body ought to be allowed to exercise educational functions. No objection was taken, no argument ensued upon this point; the proceedings of the Society were considered as a whole, the testimony of some of the highest medical authorities, as well as that of other competent witnesses regarding the result, was favourable, and the Society was left at liberty to pursue its course.

It is important to bear in mind the distinction between the circumstances under which the School of Pharmacy is constituted, and those of colleges and other educational establishments in which a revenue is derived from the fees paid by the students.

A medical school, for example, is not considered in a prosperous condition unless it produces over and above the amount of its current expenses a surplus sufficient to afford remuneration to the professors or teachers. This constitutes their income, and their interest is directly concerned in maintaining high fees and a large class of pupils. Now, if such an institution were also an examining body, if the examiners were empowered to grant or refuse at their discretion licences to practise or carry on business, if the fees for attending lectures, and the fees payable on examination were received into the same treasury as a source of revenue, the examiners would be under a temptation to secure a large class at their school by favouring their own pupils at the examination, and dealing severely with those who had been educated at other schools. The examination being compulsory—in other words, the passing of the examination being the only condition on which a licence to practise could be obtained—the power referred to might, if taken advantage of, be made equivalent to a monopoly in favour of one establishment to the prejudice of others. It would also have a tendency to lower the standard of qualification, as candidates are generally attracted by the prospect of a lenient examination, provided the nominal value of the certificate is not affected by such leniency; and a majority of them would prefer paying advanced fees with the certainty of passing easily, to saving part of the expense with the great probability of being plucked. The amount of the fees would be a secondary consideration compared with the injury which a candidate would sustain if unfairly deprived of a certificate, without which he could not legally embark in his profession. Under these circumstances the managers of an institution, combining education with compulsory examination, would be under so strong a temptation to make their power subservient to their interest, that they could not escape jealousy and suspicion, however desirous they might be to act with impartiality and uprightness.

The case of the Pharmaceutical Society is entirely different, and is free from the liability to abuse to which we have above referred. The Society is not interested in maintaining a school—the professors are not interested in attracting pupils from other schools—the examiners are not interested in favouring those who have derived their education from the Society. If any patriotic individual, or committee, would undertake the pecuniary responsibility of the School, the Society would be the gainer by several hundreds per annum. But in the absence of such act of patriotism, the Society submits to the loss; and the lectures are on a similar footing to those delivered occasionally at the College of Physicians in Pall Mall, or the College of Surgeons in Lincoln's Inn Fields, both of which are examining bodies. The lecture fees, when fees have been charged, were only nominal, and a very small set-off against the expenses; and although the total amount of fees from the laboratory class has been considerable, it has been barely sufficient to defray the working expenses, including the remuneration of the Professor and Assistants, but exclusive of rent, rates, and other incidental charges of the establishment. The examinations of the Pharmaceutical Society are not, in the ordinary sense of the term, compulsory. The refusal of the certificate does not restrain the candidate from carrying on the

business. The Society may attract but cannot compel candidates to come up for examination, and the power of attraction will depend entirely upon the value of the certificate. If the examination were to be so lenient as to be merely nominal, the certificate would be worthless, and would not be sought—if too severe, the examiners' occupation would be gone for want of candidates. In either case the Act of Parliament would become a dead letter. The prosperity of the Society will, therefore, be dependent upon the judgment and impartiality with which the character of the examination is upheld and undue severity avoided. This will be the best security against those abuses which sometimes prevail in institutions where the interests and the duties of the management are antagonistic.

In order to give effect to the examinations, the students must have the means of acquiring the requisite knowledge. Some individuals may enjoy peculiar advantages, some may possess the faculty of self-tuition to a remarkable degree, but the majority require to be led into the right course, and provided with systematic instruction. The education of Pharmaceutical Chemists is a novelty in this country, and the demand has not yet called into existence a supply of schools for this purpose. We hope to see such schools rise up and flourish, and when that hope is realised, the object for which the School in Bloomsbury Square was founded will have been attained, and the Society may resign its educational functions.

It has been asserted that the medical schools afford all that is requisite for the education of the Pharmaceutical Chemist, and we have lately seen in print rather a ludicrous denunciation of the School of Pharmacy, the Professors, the Council, the Members of the Society, the Pharmacy Act, and those who have been most active in promoting the education of Pharmaceutical Chemists. This general anathema is contained in a series of effusions, remarkable for sarcastic humour and inventive talent, but too comic to deserve further notice in this Journal, although one of our correspondents (an apprentice in the country) was so far misled by a statement respecting the Lectures on Botany, that he actually wrote to enquire whether it was founded on fact!

We may observe that the arrangements respecting the School of Pharmacy will claim the serious attention of the Council, as it is highly desirable that this branch of the establishment should be made subservient to the purposes for which the Society was founded, and the Act of Parliament obtained. It is equally important that the responsibility of carrying out the provisions of the Act should be kept in view, and that every department of the Society should be so regulated as to be free from objection or liability to the charge of abuse of power.

THE PROGRESS OF PHARMACY IN AMERICA.

We subjoin extracts from the *American Journal of Pharmacy* of July, showing the vigorous efforts which the Pharmaceutists in that country are making to raise their character and improve their qualifications by voluntary means. They are not protected by Act of Parliament or assisted by the legislature, but being sensible of the defects and abuses which exist, they have come to the determination that the remedy shall be provided by themselves. A regular correspondence is established which is extending throughout the continent of America. By means of scientific meetings, periodical conventions attended by delegates from various places, and published reports extensively circulated, the leaders of this movement are endeavouring to infuse into the minds of their brethren a laudable ambition and a disposition to co-operate in the undertaking.

We feel particularly interested in these proceedings because the nucleus existed in America some years before the commencement of similar efforts in this country. At the time the Pharmaceutical Society was proposed, the Colleges of Pharmacy in Philadelphia and New York were referred to as examples of the superior position of Pharmacy on the other side of the Atlantic; and although these institutions were conducted on the voluntary principle, and at

that time exercised a very limited influence, they have now acquired a character which has laid the foundation for a very extended reform in the cultivation and practice of Pharmacy.

We have reason to believe that the Transactions of the Pharmaceutical Society of Great Britain, and the progress which the Society has made, operated as a stimulus to our transatlantic brethen in the same manner that their early proceedings stimulated us. The exchange of Journals between the two nations, the emulation thus excited, and the promulgation of information as to what may be effected by the united influence of the members of an organised body, act and re-act in the development of mental cultivation and the advancement of science. A Chemist and Druggist who has been brought up in the idea that his business is merely a mechanical trade, when he is reminded of the amount of science involved in the manipulations he has to perform, the discoveries which are continually taking place, and the progress which others are making, begins seriously to consider whether he is not in danger of being left behind and finding himself supplanted by those who have studied their business as a profession under more favourable circumstances. It may be too late to go to school, but it is never too late to learn; and when an opportunity is afforded of joining a Society from which he may derive useful information and a recognised position, he goes with the stream, views his avocation under a new aspect, and participates in the advantage of the improved system. He may have a son whom he intends to introduce into his business, and to whom he may desire to give the benefit of the scientific education, the value of which he appreciates by comparing the existing facilities for improvement with those which were within his reach at the time when he was an apprentice. In this manner the light of knowledge spreads among individuals, and the same influence prevails between one nation and another. The evidence given before the Select Committee of the House of Commons on the Pharmacy Bill tends to confirm this remark with regard to the progress of Pharmacy on the continent of Europe. The representatives of Pharmacy in the several nations, observing what is passing around them, and being in scientific communication with their neighbours, mutually assist and stimulate each other. The course of education is from time to time revised and extended, the stringency of the examinations is increased, and improved regulations are made relating to the sale of poisons, the detection and prevention of adulteration, the importation of drugs, and other practical details.

Subjoined are the extracts from the *American Journal of Pharmacy*, to which we invite the attention of those who are interested in the progress of pharmaceutical education.

PHARMACEUTICAL REFORM IN AMERICA.

Pharmaceutical Convention of 1852.—We have received several communications from gentlemen residing in towns where no organization exists among the apothecaries, who feel a strong interest in the approaching Convention, asking whether, from not being members of pharmaceutical societies, they are ineligible to attend the Convention. It is gratifying to find our brethren at a distance awakening to this subject. Individuals who will come a long distance to attend the sittings of such a body, actuated by a feeling of interest in its objects, can hardly fail to prove useful members, and should be admitted, in our opinion, to seats, and to partake in its deliberations, if not in its decisions. When it is considered that the Convention of last year was called for a special object, whilst that called for October next has reference to the interests of the whole profession, we cannot but view the intended gathering as an initiatory movement—as a general call with a view to future organization—rather than as an adjourned meeting of an organized body, adapted in its constitution to the object it is intended to effect. Hence it would have been wise to have given a general call to Pharmaceutists throughout the United States to meet, and, after organizing, determine on the future sources of its delegates. If that Convention should be but the commencement of a national association, as we believe, its healthy continuance will require it to be constituted of regular delegates having credentials from pre-determined authorities. If this be admitted, from whom shall the delegates come? If they are to be confined to permanent local societies, the

larger part of the apothecaries of the country would be unrepresented. With due deference to a better plan we would suggest that any *ten* established apothecaries and druggists located in one place or neighbourhood, where *no organization exists*, should be entitled to send a delegate to the Convention. This course would give a degree of authority to such delegates, who coming directly from the pharmaceutical ranks, could speak for their brethren at home. In places where organized societies are in existence, such societies should be empowered, if they desire it, to send a number of delegates proportioned to the number of apothecaries and druggists where they are located. Towns not numbering ten apothecaries should have the right to send a representative. This course would give a more liberal and republican character to the Association, and not confine its members to cities or institutions. Meanwhile, we hope that *every* pharmaceutist, whose sympathies attract him toward the Convention, will come, as there is every reason to believe that, on the first sitting of the delegates, measures will be taken to extend to them a participancy in its deliberations, if not in its decisions.

It has been repeatedly asked, what will the proposed Convention find to do? Will it be a mere formal organization without vitality, or a feasible object to accomplish, which will pass resolutions, publish them, and then disperse, satisfied that the profession will be improved and elevated? We trust that no such useless and unworthy results will be pointed to hereafter as the best fruits of the Convention of 1852. It is action, not talking that is wanted; it is wisdom, not eloquence, that is needed; it is conscientious pursuit of the general good, not individual ambition, that is desired; and it is a generous sacrifice of knowledge and influence by the better educated and successful, on behalf of those whose want of qualifications and success arises more from the force of circumstances, than from disinclination to improve their practice.

Among the subjects which merit the action of the Convention, a few will be noticed:

1st. The plan of local organization best calculated to subserve the interest of those concerned.

2d. Pharmaceutical education as it relates to the studies pursued, the manner of teaching, and the practice of the shop; together with a consideration of the means most effectual for encouraging ill-qualified established apothecaries to improve their practice.

3d. The Convention, viewing itself in the light of a scientific association, might receive written communications of scientific or industrial interest connected with Pharmacy, and, if worthy, direct them to be published in its Transactions. In this connection, it would be desirable that members should bring every offering worthy of a notice, whether in the form of draughts or models of apparatus; practical suggestions in manipulation, or criticisms on processes; specimens of, or information relating to the natural productions available in our art; and lastly, sketches of the state of Pharmacy among their constituents.

4th. With a view to more efficient action than could be effected in a Convention, standing committees might be appointed, to whom subjects should be committed for investigation during the recess, previous to the next Annual Meeting. These committees might be entrusted with such subjects as the following, viz: 1st. What are the *actual* results of the law against adulterated drugs, chemicals, and medicinal preparations, based on an examination of the custom-house records as compared with the drugs on sale;—2d. To what extent is home adulteration practised, where is it most practised, and what suggestions can be made to lessen or prevent it?—3d. What is the actual practice and custom of the Apothecaries generally throughout the Union in relation to the employment of the formulæ of the United States Pharmacopœia in making their preparations?—4th. To what extent the practice of Medicine and Pharmacy are united in the same individual, in places having more than two thousand inhabitants.

5th. Other committees of qualified individuals might be entrusted with more special subjects for investigation, as, for instance,—1st. What are the causes which occasion the decomposition of syrups, and what means can be suggested to increase their permanence?—2d. What form of evaporating apparatus adapted to the limited demand of the apothecary, is best calculated by its simplicity of construction, cheapness, and durability, to meet his wants? 3d. Whether it is better, in making hydro-alcoholic extracts, to employ alcohol and water consecutively, or mixed in the form of diluted alcohol, deciding the question by the activity of the resulting product, as ascertained by chemical analysis, if the active constituent is well defined, or by therapeutic trials if it is not?—4th. In the process of displacement or percolation, as applied to the extraction of drugs, what is the degree of exhaustion which should determine the conclusion of the process (when the quantity of product is not necessarily pre-determined, as in tinctures, wines, &c.) in view of the effects or expense of evaporation?—5th. What is the best arrangement for filtering fixed oils, combining simplicity of construction with effectiveness of action?—6th. What is the degree or amount of the deteriorating action of light on the fixed and volatile oils, tinctures, and wines, when kept properly closed, and whether it would not be better to protect these substances, or some of them, from the influence of light in our shops?

Chemistry, of all the sciences, is that most closely connected with Pharmacy, and most worthy of the attention of its practitioners. The many able individuals that now grace our profession should bring some of the fruits of their chemical observations, irrespective of their application to Pharmacy, that a taste for this noble pursuit may be encouraged.

Such a course would, in a few years, render the meetings of the *American Association of Pharmaceutists* seasons of rich intellectual enjoyment to those who participated, and greatly advantageous to those at home, from the many useful and interesting memoirs that would scarcely fail to emanate from a body so organized.

The prospective adoption of a code of ethics should be considered, and the preliminary steps taken to digest and mature it. Any action of the Convention in this direction cannot be too cautiously and carefully taken, in view of the crippled condition of druggists and pharmaceutists as a body, in reference to quackery, directly or abettingly, as well as to the great want of uniformity that exists in shop practice. The Association should aim at reformation in these respects, and especially by a thorough and faithful adoption of our National Pharmacopœia as the rule of practice. Deep-rooted evils in a profession can rarely be removed by sweeping legislation, unless the measures are enforced by despotic power. Let the well-disposed among us, therefore, show practically the working of a higher standard, as an example to those not now willing or able to adopt it, which will be more influential than volumes of precepts.—*American Journal of Pharmacy.*

PHARMACY IN RICHMOND, U.S.

Just as we were going to press the following call, issued to the Richmond Apothecaries by some of their number, was received from Mr. Laidley. The meeting to which it refers was subsequently held, and measures taken for the organization of a Pharmaceutical Society. We understand that one of the proposed conditions of membership is *proprietorship in business*, which is certainly an error in judgment, as some of the best members of our College have been those not proprietors.

"The undersigned, believing that by friendly co-operation among themselves, their respectability will be increased, their standing in the community will become more elevated, faults in their profession be remedied, evils to which they are now subjected be removed; that their art may be more systematized, and better regulated; a more friendly feeling towards each other be excited amongst them, their mutual interests advanced, and the public good promoted; do most earnestly call upon their brethren engaged in Pharmaceutical pursuits, to meet at the Gentlemen's Parlour, Exchange Hotel, on Friday evening, 11th inst., at 8 o'clock, for the purpose of considering the advantages that would result to all of them, from the formation of some organized Association, that would have for its object the above-named desirable ends; as well as to encourage among themselves mutual improvement in the knowledge so necessary to a proper discharge of those duties (both to themselves and the public), which their situations as men occupying positions among the most responsible in life, impose upon them.

"As the organization which it is now proposed to form, would contemplate the good of all its members, it is most earnestly hoped that all the Druggists and Apothecaries who feel any interest in this important subject, will cordially unite their intelligence and talents in an effort to accomplish the above-named ends, and that the proper preliminary steps will be taken for the formation of a society of the Apothecaries in this city, which will prove beneficial to its members, an honour to their profession, and a credit to the city of Richmond.

"Andrew Lesslie.	Seabrook & Reeve.	H. Blair.
S. M. Zachrisson.	Ashe & Gray.	Chas. Millspaugh.
Purcell, Laidley & Co.	Peyton, Johnston & Bro.	Alex. Duval.

"*Richmond, June 8th*, 1852."

American Journal of Pharmacy.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

At a meeting of the General Committee, July 15, 1852,

MR. GIFFORD, PRESIDENT, IN THE CHAIR,

the following Report was agreed to:—

The General Committee authorised by the Resolution of the Council, passed on the 7th of July instant, namely, "That the consideration of the provisions of the Pharmacy Bill be referred to the General Committee; and the Educational Course of the ensuing session be taken into consideration at the same time," have agreed to recommend to the Council,

1. That Mr. Smith be appointed to the office of Registrar.

2. That arrangements be made for continuing the Lectures and Laboratory, for the ensuing Session, upon the subjoined plan. (The plan is not published, being still under consideration.)

3. That no Candidate be admitted to the Major Examination under the age of twenty-one years.

4. That a SPECIAL GENERAL MEETING of the Members of the Society be held on Wednesday, the 4th day of August next, at eight o'clock in the evening, precisely, "To discuss the provisions and operation of the Pharmacy Act, and to consider the steps which it may be expedient to take in reference to it."

At a Special Meeting of the Council, held July 19th,

MR. GIFFORD, PRESIDENT, IN THE CHAIR,

the report of the General Committee, dated July 15th, was received.

The 4th recommendation was unanimously adopted, and in accordance therewith a Special General Meeting of the Society was convened by circular, and a notice ordered to be inserted on the cover of the Pharmaceutical Journal. The consideration of the other three recommendations was deferred until the next meeting of the Council.

LIST OF MEMBERS, ASSOCIATES, AND REGISTERED APPRENTICES.

Elected in April, May, June, and July.

MEMBERS.

ARBROATH	Shield, George	High Street
BEDLINGTON	Urwin, John	West End
BIRMINGHAM	Cooper, James R.	Islington Row
	Sumner, John	97, High Street
BRECHIN	Hodgeton, David	High Street
BURUTISLAND	Gall, Alexander	
DEMERARA	Carpenter, Henry	Georgetown
GLASGOW	Hart, Hugh	18, Argyle Street
	Murdoch, George	143, Sanchichall Street
KELSO	Ross, John	Wood Market
LACEBY	Watson, Horace	High Street
LERWICK	Hicks, Robert	169, Commercial Street
LISCARD	Sessions, Joseph J.	Manor Road
LIVERPOOL	Cattle, James	24, Seel Street
	Gilmour, William	1, Warwick Street

MEMBERS—*continued.*

LONDON	Harvey, Edward	6, Giltspur Street
	Hirst, Thomas J.	6, Barnsbury Street
	Hogg, Robert	9, Albion Place, Hyde Park Square
	McCulloch, Charles A.	Covent Garden
	Marshall, John	126, St. John Street Road
	Power, Edward	56, Hackney Road
	Thomas, Richard W.	10, Pall Mall
	White, Edmund	19, Regent Park Terrace
MANCHESTER	Dymond, George	Piccadilly
NEWPORT	Gwillim, John Cole	Commercial Street
NORTHAMPTON	Pullin, Edward	Gold Street
NORWICH	Baxter, John J.	St. Benedict
PRESTON	Taylor, John H.	157, Friargate
ROTHESAY	Anderson, David Kennedy	
SUNDERLAND	Scarrow, William	147, High Street
TAMWORTH	Righton, Job Castle	Market Street
TROWBRIDGE	Parker, Henry	Church Walk
WANDSWORTH	Cumbers, John	Church Row
WARWICK	Baly, Nathan	Market Place
WATFORD	Clarke, Frederic	Market Place
WIRKSWORTH	Marsh, Joseph T.	
WORCESTER	Walker, John S.	25, Cross Street

MAJOR EXAMINATIONS.

Anderson, David Kennedy	Rothesay
Baschet, Georges Constant	Mauritius
Bell, James	Stockport
Cotton, Charles Newell	Plymouth
Forrest, Richard	London
Fisher, Glengarry	Edinburgh
Gall, Alexander	Burutisland
Gregory, Thomas	St. Asaph
Grimsdale, James	Chelsea
Millar, Thomas	Dunfermline
Parkinson, Robert	Croydon
Ross, John	Kelso
Smith, William	Hadleigh
Sumner, William	Eccleshall
Turney, Samuel B.	Yeovil
Wheeler, Francis	Northampton
Whitwell, John Herring	Ipswich
Wills, Thomas Doidge	Barnstaple
Witt, Henry Matthew	Chelsea

MINOR EXAMINATIONS.

Barret, Edward Louis	London
Baschet, Georges Constant	Mauritius
Blackburn, Francis	Ramsgate
Chenery, William H.	Ipswich
Cobb, John Vinsct	Deal
Dods, John Thomas	Portobello
Gooch, William	St. Neots
Green, Thomas	Leamington
Gregory, Thomas	St. Asaph
Harris, William Harry	Cambridge
Hornsby, George Greenwood	Odiham
Lea, Charles Wheeley	Cheltenham
Millar, Thomas	Dunfermline
Picciotto, Samuel	London
Sumner, William	Eccleshall
Witt, Henry Matthew	Chelsea

REGISTERED APPRENTICES.

NAME.	RESIDING WITH	TOWNS.
Averill, John	Messrs. Fowke	Stafford
Baldwin, Thomas	Mr. Critchley	Blackburn
Bond, Henry F.	Mr. Bond	Hoxton
Britten, Thomas J.	Mr. Davis	Leominster
Carter, Thomas E.	Mr. Knott	Exeter
Clarke, Arthur	Mr. Baker	Chelmsford
Cook, George R.	Mr. Brend	Swansea
Deighton, Thomas M.	Messrs. Lea and Co.	Worcester
Dempsey, William	Mr. Ramsay	Penrith
Ellson, Henry J. J.	Mr. Edwards	Liverpool
Eyre, Joshua J.	Mr. Wylde	Manchester
Fletcher, Thomas	Mr. Fletcher	Nottingham
Gartside, Benjamin W.	Mr. Kershaw	Stockport
Hall, Francis G.	Mr. Hickman	Newbury
Lambert, Charles P.	Mr. Ashton	Chelsea
Marrack, Philip	Mr. Searle	Crediton
Moss, William A.	Mr. Jones	Worcester
Nicholson, John J.	Messrs. Ritson	Sunderland
Pain, Walter E.	Mr. Pain	Cambridge
Payne, John	Mr. Richmond	Leighton
Ramsay, George	Mr. Ramsay	Penrith
Rhodes, John W.	Mr. Pratt	Bradford
Riley, James	Mr. Smith	S. Coldfield
Smith, William	Messrs. Sumner	Birmingham
Soulby, Edward	Mr. Turton	Howden
Southall, Joseph S.	Mr. Harvey	Leeds
Stokoe, Thomas	Mr. Reinhardt	Hull
Tanner, Joseph	Mr. Langford	Frome

ORIGINAL AND EXTRACTED ARTICLES.

EXAMINATION OF PAVON'S COLLECTION OF PERUVIAN BARKS CONTAINED IN THE BRITISH MUSEUM.

BY JOHN ELIOT HOWARD, ESQ.

(*Continued from page* 15.)

No. 9. *C. pubescens var. β purpurea* (Weddell).

This species was first found by the authors of the *Flora Peruviana*, at Pati, in the year 1780. It was named by them Cinchona Purpurea,† and the collection of Pavon contains two very good specimens under this name.

No. 51*. *C. purpurea Fl. Per.*

† CINCHONA PURPUREA (*Flor. Peruv.*)
CASCARILLO PAONAZO, CASCARILLO MORADO.
(From the Quinologia.)

This tree is commonly as much as twenty-four feet high, and has a single, upright strong stem one and a half feet thick. The ramification is not much covered with leaves, and it opens out on all sides. The branches are strong, and terminate in four convex sides. The back of the stem and of the thick branches is sometimes more, sometimes less dark grey. The upper surface is *neither rough nor uneven*, and the bark of the tender branches is *very light grey*. The marks for its selection are the following:—

1. A smooth, and only occasionally rough upper surface.
2. A light grey epidermis with some dark spots.
3. Internally a cinnamon colour.
4. The bark rolled together in such a manner that one margin rests upon the other. When the quilled bark forms a circle and a half, this is a sign that it has been taken from a tender branch before it was fully ready.
5. A thickness of a pen to that of one inch.
6. A substance of the thickness of some lines, provided that the bark is not from the stem.
7. A lighter weight than the foregoing.
8. A thick substance, but slightly resisting the attempt to break it.
9. An ordinary fracture, with small projecting fibres.
10. A gum-resinous sap, of such sort as corresponds with the consistence of the bark.
11. A feeble smell, but which becomes remarkable and pleasant through boiling, with some aromatic odour, but on the other hand it is not so pleasant to chew.
12. A taste more bitter, sour, and rough, like that of C. hiauta, but more pleasant, and resembling the taste of a dried rose which has already lost in great part its aroma.

No. 62*. *C. purpurea Fl. Per.*

The specimens of bark are in larger and smaller quills, with a rough coarse rigid fibre; the epidermis smooth and warty, and some pieces analogous to Cusparia bark on the outside; transverse cracks are almost wanting. The general colour of the epidermis is light grey, but the bark of the trunk is often dark brown, with patches of the whitish epiderm adhering to a surface otherwise exfoliated.

This bark accords entirely with that so named by Dr. Weddell. It occurs not unfrequently in commerce in small quantities; and in 1849 a large importation took place of this, mixed with other kinds. Its commercial value is so low as to discourage collection. I found the thick coarse bark to yield only 0.35 of a very yellow alkaloid, which resembled quinine in solubility in ether, and about 0.60 of cinchonine. It is probable that some samples may be richer than this. The vernacular name *cascarilla boba de hojas moradas*, or "spurious bark with mulberry-leaves," expresses the estimate formed of its value in the country where it grows, and the account of Poeppig, the German naturalist, does not indicate any superior qualities. He says the tree is easily distinguished from all other cinchonas by this circumstance, that its very large and membranaceous leaves are covered on the under side with very prominent violet-coloured veins, which in the early stage of the leaf are so near together, as to give a similar colour to the whole leaf. The bark, when recently gathered, is exceedingly bitter, and might be useful in the preparation of low-priced decoctions, since it could be furnished at an exceedingly low rate. "*It is, at all events, not gathered, and has served only for adulteration, which fraud may nevertheless be discovered by a superficial examination.*" M. Weddell's account is not more encouraging; he says, the name which this bark has received in its native country, proves little in its favour. It is called *carua-carua*, an Indian word, which signifies literally *llama llama*, but figuratively "*very bad*," or "very inferior." The llama is indeed looked upon as one of the most inferior animals. In the province of Carabaya, Dr. Weddell adds, he heard it "called also *cascarilla*, or *quina amarilla*, the appellation which Mutis gave, as is well known, to his C. cordifolia. *The two barks are indeed extremely alike.*"

The variety *α* Pelletierana is not represented in the collection, although it is stated by a recent collector in Peru that it may be had in abundance, and could be sold very cheap. There is something very peculiar in the chemical constitution of this bark, which merits further investigation. The characterizing yellow colouring matter found in the *pubescens* is *intense* in this variety, and seems to pervade the whole plant, the leaves (if I may judge from a dried specimen in my possession), stalks, and bark; it is, moreover, extremely difficult to isolate the alkaloid from this colouring matter, but when this is effected, it crystallizes freely from ether. The taste of the bark is very nauseous.

The following specimens in the Museum must also be referred to this head, viz.:—

No. 19. *Cinchona cascarilla crespilla ahumada de Loxa.*

No. 21. *C. cascarilla amarilla de Chito, Provincia de Jaen, Loxa.*

No. 35. [*C. quina amarilla de Quito de Loxa.*]
No. 67*. *C. amarilla de Chito sp. nov. inedit.*
This last specimen has a peculiar feature in suberous convex excrescences, covered with the usual silvery epidermis. It is not to be distinguished, however, from the specimens of C. purpurea.

Derivation of "Huamalies" Bark.

The *cascarilla boba* (*fools*, or "worthless bark"), which Poeppig brought back with him to Germany, was submitted to the examination of Reichel, who pronounced it "*the Huamalies bark of trade*," and describes it as "consisting, for the most part, of very young quills, which in part are wholly without the warty elevations, but possessing more abundantly the peculiar longitudinal wrinkles, which distinguish the Huamalies bark from all others. In the younger quills the colour shades off to fallow-grey—in the older the warty elevations are conspicuous, and the brown lichens are more abundant, which communicate to this commodity a well-known brown colour, when many old barks are lying together in a small compass. Particular pieces are covered with many white lichens, but fully developed lichens are not found on it, with the exception of *Usnea Cinchonarum*. The quills are 1½ to 2½ feet long, ½ to 1 inch in diameter. The taste is sourish and extremely bitter, but this is only perceived after long mastication. The decoction has on cooling a yellow-loam colour, and conducts itself with the usual reagents as a very useful, though a very cheap bark."

This is Reichel's account; but Dr. Edward and Julius Martiny, in their publication, the *Encyklopædia der medicinish-pharmaceutischen Naturalien und Rohwaarenkunde*, give a different aspect to the matter. They say (in describing the barks of Poeppig) "*cascarilla boba is only used for adulteration*, and passes erroneously for a wholly useless bark. With much politeness Professor Poeppig presented us with a specimen of this bark, which comes occasionally, but rarely, in trade, and is found among Loxa barks. It consists of rolled quills of ½ to 1 inch in diameter, the outer coat of which has very little resemblance to that of other cinchonæ. Its epidermis is (for example) *almost without cross cracks, smooth*, and only crumpled together into long folds by drying. The colour is grey-brown sprinkled with white. *Reichel assumes these barks to be the Huamalies barks of trade*, and found upon them warty elevations and other tokens of Huamalies bark; but that which we received as *cascarilla boba, has not the smallest resemblance to the Huamalies bark*, as will sufficiently appear from what has been said."

This remark is quite applicable to Poeppig's specimen (it is true a small and poor one) of *cascarilla boba* in the Pharmaceutical Society's collection. It has not the slightest resemblance to Huamalies bark.

It would appear then that Reichel must have been too hasty in identifying the *cascarilla boba* with Huamalies bark, and this is made more clearly evident from several considerations.

First.—The internal evidence of Poeppig's own account militates against this identification. He says nothing of the warty character or other tokens on which Reichel dwells; whereas, it is unlikely he would wholly have omitted noticing the *warty character*, at least, if he had been describing *Huamalies* bark; and then what he *does* mention is, that the bark is almost worthless, and only used for adulteration.

The Huamalies bark, on the contrary, has established its reputation in Europe, and especially in Germany, as a bark of the better description. According to Bergen and Goebel, "it first was known in 1803 in Europe; it was sent in large quantities from 1810 to 1815, and *belongs to the better and more efficacious kinds of bark.*"‡ "Externally (M. G. says), the Huamalies

‡ Goebel, *Ph. W.*, i., p. 62.

has a dark rusty-brown colour, which is lighter in some pieces and darker in others, and often shading off towards a reddish colour. The younger barks not unfrequently appear fallow-grey, especially when the epidermis is present, and are sometimes covered with white or entirely dark spots, occasioned by the adhering *thallus*. On the old bark many wart-like elevations are remarked on the surface, *which distinguish this bark from all others*. These warts are very seldom absent, and that only in the case of very young barks. For the most part the surface is covered with many wrinkles, less often with cross-cracks, and then only on old barks. The young barks are commonly *long*, *wrinkled*, and have fewer or no wart-like elevations, but *always a brownish colour*, which distinguish this bark from all other sorts. On old bark the outer coat is soft and corky, may be scraped off, and then one not unfrequently sees a soft white shining membrane, under which there lies a thicker, tender, inner bark."

These, with other characteristics, are given by Goebel for Huamalies. It certainly appears to me that the bark gathered by Poeppig from the C. pubescens, and described by Reichel, must have been of a very different appearance and quality.

Second.—The chemical analysis is different, so far as it has been carried out.

I have experimented on a sample of *brown warty* Huamalies, agreeing in general appearance with Goebel's Pl. X., fig. 1—5, and found the bark rich in alkaloids, and with no peculiarity such as always marks the two varieties of C. pubescens.

In my experiments, as in those mentioned by Goebel, "the thick and flat warty pieces were richer in alkaloid than the thin young quills."

Third.—The comparison of microscopic structure is against the identification.

M. Guibourt has been good enough to send me over examples of the varieties of Huamalies which are so well described by him in the *Hist. Drogues*, IVme edit., vol. iii., p. 145—8, that I need only refer the reader to this volume for particulars. From these I selected the *Huamalies blanc*, which ought the most to resemble the bark of C. pubescens. Having taken a slice of it, I compared it, under the microscope, with a section of the bark of C. pubescens, var. purpurea, from the kind first mentioned in this paper, as found in commerce in 1849, and found it to present a very different appearance.

I conclude, therefore, on the whole, that Reichel must have been misled by some superficial resemblance. The bark of C. purpurea, in Pavon's collection, has some few *warts*, and so has the Huamalies; the epidermis is sometimes wrinkled, and so is the Huamalies; but on comparison the apparent coincidence disappear. The warty excrescences are wholly *unlike*, and the barks are altogether markedly distinct.

To what source, then, are we to ascribe this important bark, whether we look on its varieties as *distinct* with M. Guibourt, or as *one* with Goebel?

The question appears difficult to answer, for I believe the Huamalies district is botanically unexplored. I am not aware of any researches in that immediate locality, and Poeppig, who was near it, has, it seems, thrown no light on the subject.

It follows that this must be left as one of the unsolved problems, and yet I cannot but think the *C. Chahuarguera* of Pavon is very near to (if not identical with) the *Huamalies* bark, as I mentioned in a previous paper.

This variety of C. Condaminea is called by De Candolle§ *β Chahuarguera*. This distinguished author refers to this variety the fruit-bearing branch with outline leaves in the engraving of C. Condaminea, in Humboldt's Pl. Eq. The leaves are elliptical, and this and other differences constitute, according to De Candolle, a distinct variety. A specimen (in my possession) gathered by Bonpland has this characteristic, and is markedly distinct from another gathered by

§ Prodromus, iv., p. 352.

Pavon, which last is evidently identical both with the main figure in Humboldt's plate and with Seeman's specimen.

The bark of the *Chakarguera* in the Museum is perhaps yet more evidently a *distinct variety*. It is from comparatively young branches, and, therefore, does not fully show the character of the tree; but the resemblance is (if I do not mistake) so close that it would pass for Huamalies. The warty elevations, where they occur, are similar in appearance to those of this latter bark, and also the peculiar structure of the softer-coated pieces. In these we first see a brown epidermoid coat, beneath this lies a glistening micaceous suberous coat; when this is scraped off a brown rusty cellular coat appears, which immediately envelopes the liber. The epiderm and suberous coat are soft, and easily removed by the nail.

These observations were noted down from Pavon's specimens by Dr. P. and myself, and that without any knowledge of Goebel's description of Huamalies; but it seems to me the subject of observation must have been similar in both cases.

It is to be desired that some botanist would explore this district, and settle the question thus pending, which cannot be regarded as unimportant in either a botanical or a commercial point of view.

(To be continued.)

ON NAG-KASSAR.

BY BERTHOLD SEEMANN.

The fragrant flower buds imported under the name of *Nag-Kassar*, or more correctly *Nageser*, the name being a corruption of the Sanscrit words *Naga* and *Kesara*, have been referred by Dr. Pereira (*Pharmaceutical Journal*, vol. x., p. 449) to *Calysaccion longifolium*, Wight, by Dr. W. G. Walpers (*Botanische Zeitung*, vol. ix., p. 367) to *C. Chinense*, Walpers. This difference of opinion has arisen from a discrepancy in the description of *Calysaccion*, in the *Illustrations of Indian Botany*. Dr. R. Wight there describes the peduncles as short, the stamens as submonadelphous, and the connectivum as truncated. Dr. Walpers found that those terms could not be applied to the buds which he examined; that the peduncles were long in proportion to the flowers, the stamens entirely free, and the connectivum acute. Hence he concluded that the buds must belong to another species, which, thinking China to be its native country, he called *Calysaccion Chinense*.

Having examined a number of buds, and also some specimens in Sir William Hooker's Herbarium, I became convinced that the differences are not such as would justify the establishing of a new species; the stamens being, in fact, sometimes quite free, sometimes submonadelphous; and the connectivum truncated and acute in one and the same flower. One point of difference, however, still remains between Wight's description and the buds. "No one," says Dr. Walpers, "would call a peduncle, which is more than half an inch long, short in proportion to the flowers." But this discrepancy—apart from the fact that short and long, broad and narrow, are merely relative terms—must be regarded as a mistake, which even the most painstaking naturalist is apt to make. The specimens in Sir William Hooker's Herbarium leave no doubt that the peduncles are proportionately long; and the buds may therefore, without hesitation, be considered as the produce of *Calysaccion longifolium*, Wight (*C. Chinense*, Wlprs.).

The buds are about the size of a pea, and of an orange-brown or cinnamon colour. They emit a fragrance not unlike that of violets, or green tea; and Dr. Pereira has suggested that on account of this odour they might be valuable as a perfume. Their chief use, however, and that for which they are employed in the East Indies, is dyeing silk. What colour they produce is not known, but it is probably yellow. My esteemed friend, D. Hanbury, says, in a letter to

me, "A decoction of the Calysaccion buds possesses, I find, but very little colour, as the enclosed slip of blotting paper, which has been dipped into it, will show. If, however, a little subcarbonate of potash be added to this simple decoction, a tolerable deep orange brown is produced. The piece of calico sent, having been steeped in a weak solution of alum, was boiled in this alkaline decoction, but the buff colour it has acquired is not remarkably fine; perhaps some one acquainted with dyeing might succeed in producing a better hue."

The genus *Calysaccion* is allied to *Kayea*, Wall; and the only species as yet discovered is *C. longifolium*, Wight, a beautiful tree, found in abundance on the top of the Malabar Ghauts, in the southern Mahratta country, in the west Mysore and Coorg, on the Parell and Worlu hills, Bombay, and in the Kennery jungles. The leaves are opposite, oblong, coriaceous, and evergreen. The flowers appear in March and April, and are produced in clusters on the old wood. They are whitish-yellow streaked with red, and polygamous. The male plant is called *Woondy*, the female *Poonag*, while both are known by the names of *Suringee* and *Gordcoondy*. The term *Nagesur*, which is applied to the buds in commerce, is given to them in India, in common with those of several other *Clusiaceæ*.

An improved generic character of *Calysaccion* has been published by Dr. Walpers (*Bot. Zeit.* vol. ix., p. 367), and all required now to complete our knowledge of the plant is a description of its fruit, and some information about the dye which the buds produce, and the mode of extracting it.

Kew, July 8, 1852.

THE SIMABA CEDRON.

In vol. x., pp. 344—348, we published a description and figure of this plant by Sir W. Hooker; and in our number for December, 1851 (vol. xi., page 280), we published a notice of this tree by M. Berthold Seemann, which originally appeared in Hooker's *Journal of Botany*. The seeds are there mentioned as an antidote for the bite of snakes, scorpions, and other venomous reptiles.

Mr. Squire has recently obtained a supply of the seeds from a gentleman who brought them to this country from New Granada, and who states that the natives place great reliance on their efficacy. It is customary to carry some of the seeds in case of need, and immediately after the bite has been inflicted a portion of the seed is scraped off, moistened with water, and applied to the wound. A small quantity (from two to five grains) is also diffused in water and swallowed; no other precaution is taken.

The remedy is also said to have proved efficacious in cases of intermittent fever when quinine has failed, and it has been used endermically in rheumatism and gout with some benefit. Experiments recently made in the Zoological Gardens, on animals which had been bitten by the rattlesnake and other reptiles, tend to confirm the statements respecting the efficacy of this seed as an antidote.

By the authority of Mr. Squire we publish the formula for a preparation which is occasionally prescribed:—

ACETUM SIMABÆ CEDRONIS.

℞ Powdered seeds of Simaba Cedron, 2 scruples.
Distilled vinegar, 1 ounce.
Macerate for seven days and strain.

The dose is from twenty minims to one drachm.

ON CORNUS MASCULA.

BY DR. X. LANDERER.

This tree is frequently found in the east, either cultivated in gardens or growing spontaneously. The fruit is called Κρανια, and in consequence of its agreeable and acidulous taste is much esteemed by the Turks, and the juice is preserved in different ways, and used for making scherbets, which are recom-

mended as very refreshing and wholesome beverages. This fruit is also considered to be styptic, and at the time the cholera morbus raged at Constantinople, it was the only fruit allowed to be eaten, having been sold in the streets and bazaars for that purpose. The syrup made from the fruit is used in the same way as syrup of raspberry is used in Germany. The unripe fruit is preserved in vinegar, and eaten like olives or tomatoes.

The *Cornus Mascula* was known to the ancients, and Homer states that the celebrated enchantress Circe gave the fruit to the followers of Ulysses. Pliny also mentions the plant, and says that the flowers are beneficial in diarrhœa. They are still used for this purpose in the east.

ON THE FALLACY OF THE CHEMICAL THEORY OF CARIES OF THE TEETH AND BONES.

(In reply to Mr. Robertson's Letter.)

BY J. L. LEVISON, ESQ., D.D.G.

As your periodical is characterized by a truthful spirit, I ask you to insert a few remarks on Mr. Robertson's letter, which appeared in the June number of your widely-circulated Journal, particularly as his theory of *caries* is decidedly heterodox.

In order to render my observations practical, I may premise that the primary rudiments of the teeth are composed of separate mucus follicles—that they are supplied with numerous filaments from the maxillary branch of the fifth pair of nerves—and are abundantly supplied from the internal maxillary branch of the external carotid artery.

If we trace the premonitory symptoms of decay, we shall find that instead of the chemical theory of caries being tenable, facts demonstrate and the phenomena satisfactorily confirm the theory, that in every instance the actual destruction of a tooth is dependent on inflammatory action. 1st. That in them, as in every other organ, there is an increased vascular action, attended with swelling of the neighbouring organs, such as the gums, periosteum, &c.; 2nd. That there is in the acute form a perceptible sensation of throbbing, and which, like the same phenomenon on a muscle, is a most certain diagnostic, or premonitory indication of the formation of *pus*; 3rd. That the process of caries is confined to the organized dentine, and that the destruction of the enamel is owing to the want of mechanical support, the subjacent softened and blackened bone (dentine) giving way under the enamel, whenever any hard substance comes in contact with the latter.

The advocates of the chemical theory reason *à posteriori*. They observe that acids, whether in medicine or when used for edible purposes, render the enamel transparent and brittle, and that the decay of the tooth itself is the natural consequence. They forget that first, it is only the dentinal walls which enclose the nerve vascular pulp, that posses a true osseous structure, having a tubular arrangement, and supplied with blood-vessels; whilst the enamel is simply composed of prisms, so closely arranged as to present to the eye an homogeneous structure, without a trace of nerve or blood-vessel; and that it (the enamel) bears the same anatomical and physiological relation to bone, as does the *cuticle* to the true skin; and just as in the cuticle there is not any sensation *per se*, so also there is not any sensation in the enamel. The chemical theory cannot explain the increased vascularity of the teeth in fevers, in which the dentine has a reddish tinge, which appears through the enamel. I have many specimens from Dublin Fever Hospital. Nor will it account for the formation of matter within the cavity of the tooth, nor for the agonized condition of the teeth in chronic constipation, &c., &c. The enamel is simply a covering for the greater security of the pulp-cavity. But as the Author of

Nature has combined in all his works beauty and utility, such an envelope to the dental instruments is a proof that they are not an exception. If the *chemical* theory were true in reference to caries, we should not by it have any solution of the problem,—that when the enamel of a tooth is broken by an accident, such as from a blow, or the fall of a horse, that the dentine becomes tender from exposure, pain follows, attended with a general disturbance of the health, and if not removed, there is not any cessation of the agony in the diseased organ until matter is formed; and even afterwards, there is then a liability to a renewal of the symptoms whenever the general tone of the system is disturbed, whether from a cold, or from great mental excitement; the weak organ is re-attacked, becomes carious, and is obliged to be extracted: and this is the case even when it is impossible to find any acidity in the saliva.

In conclusion, I protest against the use of cements of any kind, as they never can be used with impunity, and too often they induce serious injury to the remaining teeth, and also to the general health. It matters not whether the mercury is measured by a simple or scientific apparatus, it being an indisputable truth that two metals in the mouth at its mean temperature induce more or less galvanic action; and an acid, *sui generis*, is formed from the free oxygen in the saliva.

Hence it was that I deprecated the use of all *amalgams*, and such *alloys* as the fusible cement, bismuth, tin, and lead,* in a letter to the *Lancet*, dated September 31st, 1831. I had in a previous letter in the *Medical Gazette* (1829), under the title "On Galvanic Phenomena in the Mouth," proved, that I had often observed certain results when dentists used gold plates with silver or platina pivots. And recently I have shown in more than one publication, that the impure gold used by the "Cheap Jack Dentists," in which there is a larger portion of copper than there should be, produces effects of two kinds, 1st, the formation of deadly salts of copper; and 2nd, certain neuralgic phenomena through the galvanic action which invariably results. Finally, I am so convinced of the deep injury to patients from the destructive tendency of all alloys and amalgams, that I have never used either. And though some may deem it Quixotic, I have never for the last twenty years neglected to enter my deep protest against their use.

I may, with your permission, trouble you with a few more observations on this important subject in a future number.

14, *Devonshire Place, Brighton, July 12th*, 1852.

ON THE MANUFACTURE OF WRITING INKS.

In the manufacture of good writing ink, more nicety is required in the choice of materials, as well as greater skill in manipulation, than is generally bestowed upon it.

The proportion of the various ingredients used is a matter of considerable importance, affecting in a great degree the durability of the ink.

Dr. Lewis's Writing Ink.—Dr. Lewis, who instituted a series of very careful experiments on the manufacture of writing ink, found that equal parts of sulphate of iron and of galls gave an ink, which, although of a good colour when first used, became yellowish-brown when the writing was kept for a moderate length of time, and that in proportion to the quantity of the sulphate, the inks were less durable in colour, and that those in which the galls were in excess, were most durable.

He, therefore, recommended the following proportions as best suited for the manufacture of good writing ink:—Powdered sulphate of iron, 1 oz.; powdered logwood, ½ oz.; powdered galls, 3 oz.; gum arabic, 1 oz.; white wine or vinegar, 1 quart.

Water will answer for common purposes, but white wine formed a blacker ink than water, and vinegar formed one still blacker than wine. The addition of spirit injured

* Sir Isaac Newton's alloy.

the colour, and occasioned a precipitation of colouring matter—a decoction of logwood, instead of water, improved both the beauty and deepness of the black. The ingredients are to be put in a glass or other convenient vessel, not metallic, and the mixture shaken four or five times a day. In ten or twelve days it will be fit for use, and sooner if in a warm situation; but it continues for a long time to improve if left without decantation. When it is separated from the powdery residue, it will be kept in a good state with greater certainty, if some broken galls freed from the powder and some pieces of iron are put into it. Iron, however, is the only metal which it is safe to retain in contact with the ink.

Dr. Lewis gave the preference to distilled or rain water in the manufacture of ink, but it seems probable that a water containing a certain proportion of carbonate of lime is more suitable. In dyeing a black colour by means of galls or sumach and copperas, hard spring water is preferred by some dyers. To produce in a liquid a given depth of colour, distilled water requires more dyestuff than common spring water. This is illustrated in the following experiment, devised by Mr. Phillips: into two glass jars of the same size, each half-filled with distilled water, introduce equal quantities of infusion or tincture of galls or sumach, and an equal number of drops (only three or four) of a solution of copperas; a faint purplish colour will be developed in both jars, but if one is filled with spring water, the colour in that rapidly becomes dark reddish-black, and one-half more water is required to reduce it to the same shade of colour as the other. The water which is found by experience to be best adapted for dyeing with galls and sulphate of iron, differs from distilled water in containing sulphate of lime, carbonate of lime held in solution by free carbonic acid, and chloride of calcium. The beneficial ingredient seems to be the carbonate of lime, which possesses slight alkaline properties, for if the smallest quantity of ammonia or of bicarbonate of potash is added to the distilled water in the above experiments, the purple colour is struck as rapidly and as deeply as in the spring water; chloride of calcium and sulphate of lime, on the contrary, produce no sensible change either in the depth of colour or the tint. The effect is no doubt referable to the action of the alkali or lime on the proto-sulphate of iron, by which the sulphuric acid of the latter is withdrawn, and hydrated protoxide of iron set free, for protoxide of iron is much more easily peroxidized and acted upon by tannic and gallic acids (the dyeing principles of galls) when in the free and hydrated state, than when in combination with sulphuric acid. Neither the caustic fixed alkalies (potash and soda) nor their carbonates can be well introduced in the above experiments, as the slightest excess reacts on the purple colour, converting it into a reddish-brown. Ammonia, lime-water, and the alkaline bi-carbonates also produce a reddening, and if applied in considerable quantity, a brownish tinge. It is very probable that the above-mentioned principle is applicable to the preparation of writing ink.

Ribancourt's Writing Ink.—M. Ribancourt, who paid much attention to the preparation of inks, stated that none of the ingredients should be in excess. "If there be a want of the matter of galls, part of the vitriol will not be decomposed; if, on the contrary, there be too much, the vitriol will take as much as it can decompose, and the remainder will be nearly in the state of the decoction of galls, subject to change by becoming mouldy, or to undergo an alteration after writing which destroys its legibility much more completely than the change undergone by ink containing too small a portion of the galls.

"It is doubtful whether the principles of the galls are well extracted by cold maceration, and it is certain that inks made in this way flow pale from the pen, and are not of so deep a black as those wherein strong boiling is recurred to."

From all the foregoing considerations, M. Ribancourt gives the following directions for the composition of good ink:—

"Take 8 oz. of Aleppo galls (in coarse powder); 4 oz. of logwood (in thin chips); 4 oz. of vitriol of iron, 3 oz. of gum arabic (in powder); 1 oz. of vitriol of copper; and 1 oz. of sugar-candy. Boil the galls and logwood together in 12 lb of water for one hour, or till half the liquid has evaporated. Strain the decoction through a hair sieve or linen cloth, and then add the other ingredients. Stir the mixture till the whole is dissolved (more especially the gum), after which leave it to subside for twenty-four hours. Then decant the ink, and preserve it in bottles of glass or stone-ware well corked." The sulphate of copper must be omitted in the preparation of an ink required for steel pens.

Dr. Bostock's Instructions for the Manufacture of Ink.—A few years since, Dr. Bostock presented to the Society of Arts the following valuable communication "On the Properties of Writing Inks," which will be read with interest.

"When the sulphate of iron and the infusion of galls are added together, for the purpose of forming ink, we may presume that the metallic salt or oxide enters into combination with at least four proximate vegetable principles, viz., gallic acid, tan, mucilage, and extractive matter, all of which appear to enter into the composition of the soluble part of the gall-nut. It has been generally supposed that two of these, the gallic acid and the tan, are more especially necessary to the constitution of ink; and hence it is considered, by our best systematic writers, to be essentially a tannogallate of iron. It has been also supposed that the peroxide of iron alone possesses the property of forming the black compound which constitutes ink, and that the substance of ink is rather mechanically suspended in the fluid than dissolved in it.

"Ink, as it is usually prepared, is disposed to undergo certain changes, which considerably impair its value; of these, the three following are the most important:—Its tendency to moulding; the liability of the black matter to separate from the fluid, the ink then becoming what is termed ropy; and loss of colour, the black first changing to brown, and at length almost entirely disappearing.

"Besides these, there are objects of minor importance to be attended to in the formation of ink. Its consistence should be such as to enable it to flow easily from the pen, without, on the one hand, its being so liquid as to blur the paper, or, on the other, so adhesive as to clog the pen and be long in drying. The shade of colour is not to be disregarded; a black approaching to blue is more agreeable to the eye than browner ink; and a degree of lustre or glossiness, if compatible with due consistence of the fluid, tends to render the characters more legible and beautiful.

"With respect to the chemical constitution of ink, I may remark that, although as usually prepared it is a combination of the metallic salt or oxide with all the four vegetable principles mentioned above, yet I am induced to believe that the last three of them, so far from being essential, are the principal cause of the difficulty that we meet with in the formation of a perfect and durable ink.

"I endeavoured to prove this point by a series of experiments, of which the following is a brief extract.

"Having prepared a cold infusion of galls, I allowed a portion of it to remain exposed to the atmosphere, in a shallow capsule, until it was covered with a thick stratum of mould, the mould was removed by filtration, and the proper proportion of sulphate of iron being added to the clear fluid, a compound was formed of a deep black colour, which showed no further tendency to mould, and which remained for a long time without experiencing any further alteration. Another portion of the same infusion of galls had solution of isinglass added to it, until it no longer produced a precipitate; by employing the sulphate of iron, a black compound was produced, which although paler than that formed from the entire fluid, appeared to be a perfect and durable ink.

"Lastly, a portion of the infusion of galls, was kept for some time at the boiling temperature, by which means a part of its contents became insoluble; this was removed by filtration, when, by addition of sulphate of iron, a very perfect and durable ink was produced.

"In the above three processes, I conceive that a considerable part of the mucilage, of the tan, and the extract, were respectively removed from the infusion, whilst the greatest part of the gallic acid would be left in solution.

"The three causes of deterioration in ink, the moulding, the precipitation of black matter, and loss of colour, as they are distinct operations, so we may presume that they depend on the operation of different proximate principles.

"It is probable that the moulding more particularly depends on the mucilage, and the precipitation on the extract, from the property which extractive matter possesses of forming insoluble compounds with metallic oxides.

"As to the operation of the tan, from its affinity for metallic salt we may conjecture that, in the first instance, it forms a triple compound with the gallic acid and the iron, and that in consequence of the decomposition of the tan, this compound is afterwards destroyed. Owing to the difficulty, if not impossibility, of entirely depriving the infusion of galls of any one of its ingredients without in some degree affecting the others, I was not able to obtain any results which can be regarded as decisive; but the general result of my experiments favours the above opinion, and

leads me to conclude that, in proportion as ink consists merely of the gallate of iron, it is less liable to decomposition or to experience any kind of change. The experiments to which I have alluded above, consisted in forming a standard solution by macerating the powder of galls in five times its weight of water, and comparing this with other infusions, which had either been suffered to mould, from which the tan had been extracted by jelly, or which had been kept for some time at the boiling temperature, and by adding to each of these respectively both the recent solution of the sulphate of iron, and a solution which had been exposed for some time to the atmosphere.

"The nature of the black compound produced was examined, by putting portions of it into cylindrical jars and observing the changes which they experienced with respect either to the formation of mould, the deposition of their contents, or any change of colour. The fluids were also compared by dropping portions of them upon white tissue paper, in which way both their colour and their consistence might be minutely ascertained. A third method was to add together the respective infusions, and the solutions of the sulphate of iron, in a very diluted state, by which I was enabled to form a more correct comparison of the quantity and of the shade of the colouring matter, and of the degree of its solubility.

"The practical conclusions which I think myself warranted in drawing from these experiments are as follows:—In order to procure an ink which may be little disposed either to mould or to deposit its contents, and which at the same time may possess a deep black colour not liable to fade, the galls should be macerated for some hours in hot water, and the fluid filtered; it should then be exposed for about fourteen days to a warm atmosphere, when any mould which may have been produced must be removed. A solution of sulphate of iron is to be employed which has been exposed for some time to the atmosphere, and which consequently contains a certain quantity of the red oxide diffused through it. I should recommend the infusion of galls to be made of considerably greater strength than is generally directed, and I believe that an ink formed in this manner will not necessarily require the addition of any mucilaginous substance to render it of a proper consistence.

"I have only farther to add, that one of the best substances for diluting ink, if it be in the first instance too thick for use, or afterwards become so by evaporation, is a strong decoction of coffee, which appears in no respect to promote the decomposition of the ink, while it improves its colour and gives it an additional lustre."

Dr. Ure recommends the following formula for the manufacture of writing ink. To make twelve gallons take: 12lb of nutgalls; 5lb of green sulphate of iron; 5lb of gum Senegal; 12 gallons of water. The bruised nutgalls are to be put into a cylindrical copper, of a depth equal to its diameter, and boiled during three hours, with three-fourths of the above quantity of water, taking care to add fresh water to replace what is lost by evaporation. The decoction is to be emptied into a tub, allowed to settle, and the clear liquor being drawn off, the lees are to be drained. The gum is to be dissolved in a small quantity of hot water, and the mucilage thus formed being filtered, it is added to the clear decoction. The sulphate of iron must likewise be separately dissolved and well mixed with the above. The colour darkens by degrees, in consequence of the peroxidizement of the iron, on exposing the ink to the action of the air.

But ink affords a more durable writing when used in the pale state, because its particles are then finer and penetrate the paper more intimately. When ink consists chiefly of tannate of peroxide of iron, however black, it is merely superficial, and is easily erased or effaced. Therefore, whenever the liquid made by the above prescription has acquired a moderately deep tint, it should be drawn off clear into bottles and well corked up. Some ink-makers allow it to mould a little in the casks before bottling, and suppose that it will thereby be not so liable to become mouldy in the bottles. A few bruised cloves, or other aromatic perfume, added to ink, is said to prevent the formation of mouldiness, which is produced by the ova of infusoria animalcules.

The ink made by this prescription is much more rich and powerful than many of the inks commonly sold. To bring it to the common standard a half more water may safely be added. Even twenty gallons of tolerable ink may be made from the above weight of materials.

Scott's Writing Ink.—Mr. Scott's method of manufacturing writing ink, as patented by him in 1840, is as follows:—Take 48lb of logwood chips, and let them be saturated

two days in soft water, then put the same into a close covered iron cauldron, and add 80 gallons of soft water; let these be boiled one hour and a half, when the wood must be taken out and the fluid left, to which add 48lb of the best picked Aleppo galls in coarse powder; boil these half an hour longer, then draw off the fire, and let it remain in the cauldron twenty-four hours infusing, during which it is to be very frequently agitated; when the properties of the galls are sufficiently extracted, draw off the clear fluid into a vat, and add 40lb of pulverized sulphate of iron; let these ingredients remain a week (stirring daily), after which add four gallons of vinegar. Next take 7½lb of the best picked gum arabic, and dissolve it in sufficient water to form a good mucilage, which must be well strained, and then added to the fluid by degrees; let these stand a few days longer, when pour into the same 20 ounces of the concentrated nitrate of iron; let the whole stand by again until it has arrived at its height of blackness; next pour the clear fluid off from the sediment, and add to it the following substances, each prepared and ground separately:—

First, take half a pound of Spanish indigo, which grind very fine between a muller and stone, adding by degrees portions of the ink until it is made into an easy soluble paste; next take well-washed and purified Prussian blue five pounds, which prepare as the former, except grinding it in distilled water in lieu of the fluid, until it is formed into a soluble paste; also next take four ounces of gas black which results from the smoke of gas burners received on surfaces of glass, as is well known, which grind in one ounce of the nitrate of iron; when each is sufficiently fine, let them remain a few hours unmixed, when the whole may be incorporated with the fluid, and kept agitated daily for a week. The clear may then be poured off for use. The above will make eighty gallons of ink.

Dr. Normandy's Black Ink.—In order to supersede the use of nutgalls, Dr. Normandy patented the following process for making black ink:—

Take either sumach, elm wood, elder, chestnut, beech, willow, oak, plum, sycamore, cherry, poplar wood, catechu, or any other wood or berry, or extract of vegetable substances, containing gallic acid and tannin, or either, and put this, previously reduced to powder, into a copper full of common water, and boil it until a sufficiently strong decoction be obtained.

The quantity of water must of course vary according to the sort of vegetable substance employed; catechu, for example, requiring less water than sumach, on account of the former being almost totally soluble. To this add a certain quantity of Campeachy wood, of acetate and hydrate of deutoxide of copper, of sulphate of alumina and potash, of sulphate of protoxide of iron, in quantities which vary also according to the vegetable material first employed, and gum arabic, or the best sort of gum Senegal, in the proportion of eighty pounds or thereabouts for 340 gallons of liquid; also a variable quantity of sulphate of indigo; the whole of these last ingredients, depending on the shade of the colour intended to be produced, it is impossible to indicate absolutely the proportions in which they are to be used, as the taste and fancy of the operator must decide. Supposing, however, a blue black to be the colour desired, and sumach, for example, the vegetable ingredient selected for the purpose, the proportions should be for 240 gallons: sumach, from 12 to 15 sacks, of four bushels each; Campeachy logwood, 2 cwt. or thereabouts, according as new or old chip is used; gum arabic, 50 lb to 1 cwt.; sulphate of protoxide of iron, 1 cwt.; acetate and hydrate of deutoxide of copper, 4lb; sulphate of alumina and potash, 37lb; sulphate of indigo, 6lb, or even more, according to the intensity of the blue cast desired. If catechu were to be used instead of sumach, 1 cwt. would be required, the proportions of the other materials remaining the same.

The variously coloured precipitates which salts of iron form in the solutions of the above-cited vegetable astringent substances, all of which precipitates vary from the green to the brown (the decoction of nutgalls yielding with salts of iron only a dark purple), are the obstacles which have hitherto prevented the use of these vegetable substances, with a view to supersede nutgalls; but by means of the sulphate of indigo in various proportions, from the above-cited substances a liquid may be obtained, of different shades of colour, from dark blue to most intense black, applicable to dyeing, staining, or writing, and which may be used with every description of pen.

Dr. Normandy's Purple Ink.—To produce a purple-coloured ink called the "King of Purples," Dr. Normandy recommends the following proportions to be observed:—

To twelve pounds of Campeachy wood add as many gallons of boiling water; pour the solution through a funnel with a strainer made of coarse flannel, on one pound of hydrate or acetate of deutoxide of copper finely pulverized (at the bottom of the funnel a piece of sponge is placed), then add immediately fourteen pounds of sulphate of alumina and potash, and for every 340 gallons of liquid add eighty pounds of gum arabic or gum Senegal. Let these remain for three or four days, and a beautiful purple colour will be produced.

Dr. Normandy's Blue Ink.—Dr. Normandy's blue ink is made by operating upon Chinese blue or cyanoferruret of iron. The cyanoferruret of iron is to be ground in water with oxalic acid or bin-oxalate of potash, adding gum arabic in the following proportions: to seven ounces of water add three drachms of Chinese blue, one drachm of bin-oxalate of potash, and one drachm of gum arabic; to these ingredients a solution of tin may be added.

Girond's Substitute for Galls.—The substitute for gallnuts, patented by M. Girond, of Lyons, in 1825, is an extract from the shell of the chestnut, and also from the wood and sap of the chesnut-tree. The extract is denominated *Damajavag*, and the mode of preparing it is by reducing the chestnut-shell into small pieces, and boiling them in water.

One hundred-weight of the shells of chestnuts broken into small pieces is to be immersed in about 180 or 200 quarts of water, in a vessel of copper or any other material, except iron, and after having been allowed to soak in this water for about twelve hours, the material is then to be boiled for about three hours, in order to obtain the extract. The wood of the chestnut tree may be cut into small pieces, or shaved thin, and treated in the same way.

The extract is now to be drawn off from the boiler, and filtered through a fine sieve or cloth, after which the water must be evaporated from it until the extract is reduced to the consistence of paste.

It may now be cut into cakes of any convenient size, and dried in an oven of low temperature, and when hard, may be packed for sale, and used for any of the purposes in the arts to which gallnuts have been heretofore applied. The quantity of damajavag obtained from the above will be about eight or ten pounds.

In using this damajavag, it is only necessary to pound or otherwise reduce it to powder, when it may be mixed with other ingredients, as pulverized gall nuts.

The same chemical properties belong to the sap of the chestnut-tree, which may be extracted by tapping the trunk, and when so obtained, may be employed for the same purposes as gallnuts.

Stephens' Blue Ink.—Stephens' blue ink is prepared as follows:—Take Prussian blue, whether produced from a combination of prussiate of potash and salts of iron, or the Prussian blue of commerce, as commonly manufactured, and put this into an earthen vessel, and pour over it a quantity of strong acid, sufficient to cover the Prussian blue. Muriatic acid, sulphuric acid, or any other acid which has a sufficient action upon iron will do. If sulphuric acid is used it should be diluted a little, that is, with a quantity of water equal to about its bulk. The Prussian blue is allowed to remain in the acid from twenty-four to forty-eight hours, or longer, and then the mixture is diluted with a large quantity of water, stirring it up at the time, for the purpose of washing from it the salts of iron. When in this state of dilution, it is allowed to stand until the colour has subsided, when the supernatant liquor is drawn off with a syphon and more water added to it. This process is repeated until the acid, with the iron, has been completely washed away, which is known by testing it with prussiate of potash, which will show if it yields any blue precipitate; if not, it is sufficiently washed. The product is then placed upon a filter, and suffered to remain until the liquid has all drained away.

The Prussian blue, thus prepared, is reduced to a state containing less iron than the Prussian blue of commerce, in which state it is more readily acted upon, and rendered soluble than in any other condition.

This Prussian blue may be then placed in evaporating dishes, and gently dried. To form the Prussian blue, so operated upon, into a solution, oxalic acid is added, and carefully mixed with it, after which cold water is added (cold distilled water is best) a little at a time, making it into a dense or dilute solution, according to the colour required. The quantity of oxalic acid may vary according to the quantity of water used. It will be found that the Prussian blue that has undergone the process

of digestion, as described, requires but a small quantity of oxalic acid to dissolve it: about one part of oxalic acid will dissolve six parts of Prussian blue, the weight taken before digesting in the acid. This will answer for a concentrated solution, but for a dilute solution more acid will be required.

Prussian blue, that has not undergone digestion in acid in the way above pointed out, will require a much larger proportion of oxalic acid, from twice to three times its weight; and even then it will be greatly liable to precipitation after standing; but when treated in the way described, it is not liable to precipitate, but remains a permanent solution.

Stephens' Red Ink.—Stephens' red ink is prepared as follows:—Take a quantity of common soda, potash, or carbonate of ammonia, to which is to be added, at intervals, twice its weight of crude argol in powder. When the effervescence, arising from this combination, has ceased, pour off the solution, or filter it from the insoluble matter; to this, add by measure half the quantity of oxalate of alumina, or oxalo-phosphate of alumina, prepared by adding to precipitated alumina or phosphate of alumina, in a damp state, as much oxalic acid as will dissolve it. Into this mixture, put, when cold, as much cochineal, first bruised or powdered, as will give it a fine red colour, varying the quantity according to the shade of colour required; and after letting it stand for the space of forty-eight hours, strain it off for use.

Professor Runge's Writing Fluid.—One of the least expensive formulas for the manufacture of a writing ink, is that given by Professor Runge, who says: "I have for some time endeavoured to find a black fluid possessing the properties of forming no deposit, of adhering strongly to the paper, of being unaffected by acids, and, lastly, what is of great importance, not acted upon by steel pens.

"After many experiments, I have succeeded in obtaining a composition of the kind required, very simple in its preparation, containing nothing but logwood, chromate of potash, and water, and free from vinegar, gum, copperas, blue vitriol, and even nutgalls. The low price of this writing fluid is also in its favour. It is prepared by simply adding one part of chromate of potash to 1000 parts of decoction of logwood, made by boiling twenty-two pounds of logwood in a sufficient quantity of water to give fourteen gallons of decoction; to this decoction, when cold, the chrome salt is gradually added, and the mixure well stirred. The addition of gum is injurious. In the preparation of this ink, it must be remembered that the yellow chromate and not the bi-chromate of potash is employed, and great care is required to ensure the due adjustment of the relative proportions of the ingredients used. The best way is to make a decoction of logwood, and *gradually* add to it, well stirring the mixture, as much solution of chromate as will give the shade required.

"It appears astonishing what a small quantity of the chrome salt is required to convert a large quantity of decoction of logwood into a black writing fluid; the fact is, however, certain, and care must be taken not to allow the proportion of chrome salt to exceed half a part for each 500 parts of decoction of logwood, as a larger quantity exercises a prejudicial effect in destroying the colouring matter of the liquid, whilst in the proportion above mentioned, a deep blue black writing ink is formed, which, unlike the ink made with tannogallate of iron, is perfectly fluid, forming no deposit. This writing fluid possesses another advantage; the paper which has been written upon with it may be washed with a sponge, or be left twenty-four hours under water, without the writing being effaced. Weak acids do not destroy the writing, nor do they even change the shade, whilst that made with gallnuts is effaced, and the ink prepared with logwood and copperas is turned red.

"New steel pens are coated with a greasy substance, which prevents the ready flow of the ink; this should, therefore, be removed previous to use by moistening the pens with saliva, and then washing them in water. The application of an alkaline solution is still preferable to effect the removal of this greasy matter. This cleansing of the steel pens is absolutely essential in the case of using the ink above mentioned. I have used this ink upwards of two years, and my steel pens are not in the least degree affected. No rust is formed on the pens, so that after years of service the only wear experienced is that from constant use on the paper, thus rendering unnecessary the use of pens tipped with iridium and other hard substances."

(*To be continued*).

DESCRIPTION OF A NEW SPECIES OF AMOMUM FROM TROPICAL WEST AFRICA.

BY J. D. HOOKER, M.D., F.R.S.

Beautiful specimens of the flowers of this plant, preserved in spirits, together with a dried leaf, and the fruit, have been presented to the Kew Museum by Dr. Daniell, with the name *A. Afzelii?* Bastard Melligetta, attached. The true *A. Afzelii* of Roscoe, however, has been identified with the *A. Granum-Paradisi* of Linnæus, *A. grandiflorum* of Smith (*Exot. Flora*, vol. i. t. 111), and *A. exscapum* of Sims (*Ann. Bot.*, vol. i., p. 248, t. 13); and has been lately figured in the *Botanical Magazine*, t. 4603, from specimens which flowered at Kew. A full description of that plant will be found there, together with its intricate synonymy. The present differs widely from it; and I propose that it should bear the name of its zealous discoverer, to whom we feel extremely indebted for the light he has thrown upon the difficult subject of African *Amomeæ*.

Amomum Daniellii, Hook. fil.
(The figure is about two-thirds of the natural size of the flowers and fruits.)

Amomum *Daniellii*, Hook. fil.; glaberrimum, caule elongato folioso, foliis lineari-lanceolatis (1½ ped. longis, 3 unc. latis) longe acuminatis striato-venosis, scapis radicalibus floriferis, 2 unc. fructiferis 4—6 unc. longis 3—5 floris, bracteis oblongo-cymbiformibus obtusis, floribus flavis, corollæ lobis lateralibus patentibus subulato-acuminatis dorsali amplo obovato-oblongo cæteris longiore, labello late lineari-oblongo planiusculo rigido margine subundulato filamento basi utrinque appendicula subulata aucto, fructu lineari-ampullaceo rostrato.

Hab. Gold and Slave Coasts, and Clarence Town, Fernando Po; abundant, *Dr. Daniell*. Fl. June and July.

A tall, handsome species, growing, according to Dr. Daniell, 8-9 feet high, and the stem an inch and more thick. The flowers are described as of a beautiful yellow colour, in this respect differing widely from those of the true Melligetta, as also in the acid pulp surrounding the seeds, that of *A. Granum-Paradisi* being quite tasteless. No West African species has been described hitherto with yellow flowers, or with the parts of the flowers at all of the same shape as this. The natives call it "Barsalo," to distinguish it from a smaller alpine variety (species?), named "Tokolo m'pomah,"* which may, according to Dr. Daniell, be the same as, or closely allied to, the true Melligetta, judging from the pungency of its seeds.

Dr. Pereira has published an excellent figure of the fruit of this plant from Dr. Daniell's specimens, and suggests the possibility of its proving the same as *A. Clusii* of Smith, in Rees's *Cyclopædia*, a point it is impossible to determine from the description given in that work. The specimens I have examined of Dr. Daniell's plant are not like Pereira's figure of *A. Clusii* (*Mat. Med.* vol. ii., fig. 249), but exactly resemble the figure given of the Bastard Melligetta, fig. 251, 252, taken from fruits communicated by its discoverer.

The subject of African *Amomea* is an extremely difficult one, and except good specimens of the flowers be preserved in spirits, and of the leaves and fruit dried to accompany them, and so ticketed on the spot as to preclude the possibility of any of these three parts being confounded with those of similar species, it is quite hopeless to attempt to elucidate the species. Hitherto specific characters have been too much drawn up from very insufficient specimens of the fruit only. It is very much to be desired that this difficult matter should be cleared up, and that Dr. Daniell will renew the study with his wonted zeal in the native country of the Melligettas, and will collect all the species he encounters, in various states of flower, leaf, and seed, ticket them on the spot, and remit them to England, with such valuable notes and observations as he has been in the habit of collecting.—*Hooker's Journal of Botany.*

[Note by Dr. Pereira.—In the third edition of my *Elements of Materia Medica*, vol. ii., p. 1138, I have figured and described the fruit and seeds of this species; and M. Guibourt has also figured the fruit (*Hist. Naturelle des Drogues Simples*, 4me. ed., t. ii., p. 220, fig. 121) from a specimen given to him by me. Dr. Daniell informs me that the pulp of the fruit is at first green, then yellow, and subsequently crimson. The seeds (which Dr. Hooker has not described) distinguish this species from every other Amomum with which I am acquainted, except that of *A. Clusii* of Smith. They are ovoid, devoid of angles, smooth and highly polished, and dark brown. They have a feebly aromatic or terebinthinate flavour.—*J. P.*]

STILLINGIA SEBIFERA, OR TALLOW TREE, AND VEGETABLE TALLOW OF CHINA.

The *Stillingia sebifera* is cultivated in the provinces of Kiangsi, Kongnain, and Chehkiang,—so extensively near Haugchan, where some of the trees are several hundred years old, that all the taxes are paid with its produce. It grows alike on low alluvial plains, on the rich mould of canals, and on the sandy beach, and the trunks are sometimes made to fall over rivulets, forming convenient bridges. Its wood is hard, durable, and may be easily used for printing-blocks and various other articles; its leaves are employed as a black dye. But it is chiefly from the two proximate principles which are the constituents of *animal tallow*, the "*stearine*" and "*elaine*" contained in the fruit, the plant is so much valued; and, finally, the refuse of the fruit, after extracting the tallow, is employed as fuel and manure. The "nuts," or capsules, when ripe, are gently pounded in a mortar to loosen the seeds from their shells, from which they are separated by sifting. To facilitate the separation of the white sebaceous matter enveloping the seeds, they are steamed in tubs with convex open wicker bottoms, placed over cauldrons of boiling water; when thoroughly heated, they are reduced to a mash in a mortar, and thence transferred to bamboo sieves, kept at a uniform temperature over hot ashes. This operation of steaming and sifting is repeated, as the first does not deprive the seeds of all their tallow. The article thus obtained becomes a solid mass on falling through the sieve, and, to purify it, it is melted and formed into cakes for the press; these receive their form from bamboo hoops, a foot in diameter and three inches deep, which are laid on the ground over a little straw. On being filled with the hot liquid, the ends of the straw beneath are drawn up and spread over the top, and, when of sufficient

* Misprinted, in the *Journal of Botany*, "Tokolonl peomah."

consistence, are placed with their rings in the press. This apparatus is of the rudest description, constructed of two large beams placed horizontally so as to form a trough capable of containing about fifty of the rings with their sebaceous cakes; at one end it is closed, and at the other adapted for receiving wedges, which are successively driven into it by ponderous sledge hammers wielded by athletic men. The tallow oozes in a melted state into a receptacle below, where it cools. It is again melted and poured into tubs, smeared with mud, to prevent its adhering. It is now marketable, in masses of about eighty pounds each, hard, brittle, white opake, tasteless, and without the odour of animal tallow; under high pressure it scarcely stains bibulous paper; melts at 104° Fahr. It may be regarded as nearly pure stearine; the slight difference is doubtless owing to the admixture of oil expressed from the seed in the process just described. The seeds yield about eight per cent. of tallow, which sells for about five cents per pound.

The process for pressing the oil (*elaine*), which is carried on at the same time, is as follows:—This is contained in the *kernel* of the nut, the sebaceous matter which lies between the shell and the husk having been removed in the manner described. The kernel, and the husk covering it, is ground between two stones, which are heated, to prevent clogging from the sebaceous matter still adhering. The mass is then placed in a winnowing machine, when the chaff being separated, the white oleaginous kernels, after being steamed, are placed in a mill to be mashed. This machine is formed of a circular stone groove, in which a solid stone wheel revolves perpendicularly by the aid of an ox. Under this ponderous weight the seeds are reduced to a mealy state, steamed in the tubs, formed into cakes, and pressed by wedges in the manner already described; the process of mashing, steaming, and pressing being repeated with the kernels likewise. The kernels yield about thirty per cent. of the oil, which is called "*Iaing-yu*," and sells for about three cents per pound, and answers well for lamps, though inferior for this purpose to some other vegetable oils in use. The cakes which remain after the oil has been pressed out, are much valued as a manure, particularly for tobacco-fields, the soil of which is rapidly impoverished by the Virginian weed.

The consumption of candles in China is very great, in their religious ceremonies, &c., as the gods cannot be worshipped acceptably without candles, and no one ventures out after dark without a lantern. With trifling exceptions, these candles are made, and by dipping, of the tallow or stearine of the *Stillingia sebifera*. The wicks are made of rush coiled round a stem of a coarse grass; when of the required diameter they receive a final dip into a mixture of the same material and "*Insect-wax*," by which their consistence is preserved in the hottest weather. They are generally coloured red by a minute quantity of Akanet-root (*Anchusa tinctoria*, brought from Shangtung). Verdigris is employed to dye them green. Stearine candles cost about eight cents the pound.—*Ibid.*

CHINESE WAX, PE-LA, OR INSECT-WAX.

Prior to the thirteenth century bees'-wax was employed as a coating for candles in China; but about that period the white *wax-insect* was discovered, since which time that article has been wholly superseded by the more costly but incomparably superior product of this little creature, respecting the nature and characters of which, however, authors are at variance. From Abbé Grosier's description of it, it has been suspected to be a species of *Coccus*, but Sir George Staunton has described it as of the *Cicada* family in Entomology (*Flata limbata*). Chinese writers speak of it as an apterous insect. From the *Puntsao* and the *Kiang-fangpu*, herbals of high authority in China, Dr. Macgowan has extracted the following information respecting the waxy substance, *Pe-la*, either yielded by this animal or exuded by the plant in consequence of the insect-puncture. Authors are not agreed on this point.

The insect feeds upon an evergreen shrub, the *Ligustrum lucidum*,* found throughout Central China, from the Pacific to Thibet; but the insect chiefly abounds in the province of Sychuen. Much attention is paid to the cultivation of this tree; extensive districts of country are covered with it, and it forms an important branch of agricultural industry. In the third or fourth year of the planting it is *stocked* with the insect by man. In a few days after being tied to the branches, the nests swell, and innumerable white insects, the size of nits, emerge and spread themselves over the plant, but soon descend to the ground, where, if they find any grass, they take up their quarters. If they find no congenial resting-place below, they re-ascend, and fix themselves to the lower surface of the leaves, where they remain several days, when they repair to the branches, perforating the bark to feed on the fluid within. They soon attain a somewhat large size. Early in June they give to the trees the appearance of being covered with hoar frost, being "*changed into wax.*" Soon after, they are sprinkled with water (probably that they may be the more easily detached) and scraped off. If this gathering be deferred till August, they adhere too firmly to be easily removed. Those which are suffered to remain stock the trees the ensuing season, secrete a purplish envelop about the end of August, which at first is no larger than a grain of rice, but as incubation proceeds it expands and becomes as large as a fowl's head. This takes place in spring, when the nests are transferred to other trees, one or more to each, according to their size and vigour, in the manner already alluded to. On being scraped from the trees the crude material is freed from impurities by spreading it on a strainer covering a cylindrical vessel, which is placed in a cauldron of boiling water. The wax is received into the former vessel, and, on congealing, is ready for market.

This *Pe-la*, or white wax, in its chemical properties is analogous to purified bees'-wax, and also spermaceti, but differing from both in the opinion of Dr. Macgowan. It is perfectly white, translucent, shining, not unctuous to the touch, crumbles into a dry inadhesive powder between the teeth, with a fibrous texture, resembling fibrous felspar; melts at 100° Fahr., is insoluble in water, dissolves in essential oil, and is scarcely affected by boiling alcohol, the acids, or alkalies. This wax costs at Ningpo from twenty-two to twenty-five cents per pound. The annual product of this humble creature in China cannot be far from 400,000 lbs., worth more than 1,000,000 Spanish dollars. For particulars of the chemical properties of this wax, see the volume of *Philosophical Transactions* for 1848, where Mr. B. C. Brodie has a valuable analysis, "On the Chemical Nature of a Wax from China." In the *Comptes Rendus* for 1840, tom. x., p. 618. M. Stanislaus Julien considers this wax to be derived from three species of plants: 1. *Niu-tching* (*Rhus Succedaneum*); 2. *Tong-sing* (*Ligustrum glabrum, L. lucidum?*); and the *Choui-kia*, supposed to be a species of *Hibiscus*.—*Ibid.*

* Figured in *Botanical Magazine*, tab. 2565, by Dr. Sims, twenty-seven years ago, where it is said "a vegetable wax is procured from the berries in China." Mr. Fortune, however, tells us that after careful inquiry on the matter, in districts where this shrub abounds, he could not learn that any such substance is yielded by it. On the contrary, he has brought home with him a deciduous tree as the true plant which yields the wax in question. It is now living at the garden of the Horticultural Society, but is not in a condition to enable the genus or family of the plant to be determined.

ON SORBINE.

A New Saccharine Matter obtained from the Berries of the Mountain Ash (Sorbus aucuparia).

BY M. PELOUZE.

The berries of the mountain ash, collected about the end of the month of September, were bruised and pressed in a cloth. The juice thus obtained was left to stand in earthen vessels for thirteen or fourteen months. During this time deposits and vegetations were repeatedly formed, but these were not submitted to examination. The liquor, which underwent spontaneous clarification, was decanted, then evaporated at a gentle heat to the consistence of a thick syrup. This syrup deposited crystals of a brown colour, which after being twice treated with animal charcoal, were obtained colourless. Further quantities of the same substance were procured by successive concentrations of the remaining syrup, and these were purified with as much facility as the preceding.

Three analyses of the sorbine, made with the greatest care on perfectly white and transparent specimens, the combustion of which left no trace of residue, proved beyond a doubt that this substance contains an equal number of atoms of carbon, hydrogen, and oxygen, the composition in 100 parts being—

Carbon	40.00
Hydrogen	6.66
Oxygen	53.34
	100.00

MM. Cahours and Cloez, to whom a small quantity of this substance was sent, arrived at similar results to those given above.

When a solution of acetate of lead rendered slightly ammoniacal is added to a solution of sorbine in excess, no lead remains in the liquor, and a precipitate is formed which is first white, but which becomes slightly yellow as it is washed and dried. This precipitate when heated to 212° Fahr., exhales a slight odour of caramel, but the change which it undergoes at this temperature is very trifling. The analysis of this combination gave numbers varying between 73.63 and 75.39, the mean being 74.5 of oxide of lead in 100. The formula 4 Pb O, C_{12} H_5 O_5, is that which corresponds best with the results obtained. This would represent 74.4 per cent. of oxide of lead. The analysis of the lead salt gave 11.2 per cent. of carbon, and 1.48 of hydrogen; while theory requires 12.1 of carbon, and 1.5 of hydrogen.

It would appear from these results, that the formula for sorbine is C_{12} H_5 O_5+3 HO, or C_{12} H_{11} O_{10}, and that its combination with oxide of lead is represented by the formula (4 Pb O, C_{12} H_5 O_5).

Sorbine combines with chloride of sodium, and this compound forms crystals, which viewed by the microscope appear cubical. The author for the present merely announces the existence of this compound.

Sorbine is colourless, having a decidedly saccharine taste, which cannot be distinguished from that of cane-sugar. The crystals are perfectly transparent, hard breaking between the teeth like sugar-candy. The specific gravity of the crystals is 1.654. Water dissolves about twice its weight of it. Boiling alcohol, on the other hand, dissolves but a very small quantity, which is deposited again on cooling, in the form of octahedrons similar to those deposited from an aqueous solution.

A concentrated solution of sorbine resembles a syrup of common sugar. Its density, determined with a solution which was not quite pure, was 1.372 at 60° F. The sorbine, and the syrup which it forms with water, are therefore both a little more dense than cane-sugar and its solution.

Sorbine dissolved in water and left in contact with beer yeast, gave no indication of fermentation, even after standing for forty-eight hours at a temperature ranging from 68° to 86° F. Diluted sulphuric acid produced no alteration in it, and did not render it fermentable. Concentrated sulphuric acid attacked it quickly, giving it a reddish-yellow colour, and under the influence of a slight elevation of temperature it was converted into a black substance having a carbonaceous appearance, which has not yet been examined.

Nitric acid, either concentrated or diluted with half its weight of water, when added to sorbine and heated, disengages a great abundance of red vapours. The action, which is very energetic, continues spontaneously for a long time. Oxalic acid is obtained as the product of this action. Sorbine furnishes, like cane-sugar, more than half its weight of oxalic acid, which is deposited in large colourless crystals. It was not determined whether, in this reaction, an intermediate substance was formed before the production of the oxalic acid.

Solution of sorbine heated with the alkalies acquires a deep yellow colour, and exhales an odour of caramel. Baryta comports itself with sorbine, just as lime does. Even oxide of lead dissolves with heat in sorbine, with which it forms a yellow solution having a burnt flavour. Sorbine dissolves oxide of copper, forming a blue solution of great intensity, from which suboxide of copper is gradually deposited. Tartrate of copper and potash is also reduced, either with or without heat, by sorbine. Heated on platinum foil, or thrown on to an ignited coal, sorbine comports itself like common sugar, with which it might be confounded; like the latter, it melts, assumes a yellow colour, gives off a strong smell of caramel, and leaves a voluminous carbonaceous residue.

When heat is carefully applied, sorbine emits the vapour of water, which is slightly acid, and is changed to an acid of a deep red colour, the preparation and properties of which will be now described. Sorbine, kept for some time at a temperature varying from 302° to 356° Fahr., leaves a residue of a deep red colour, which consists principally of this new acid. This residue is to be dissolved in potash or ammonia, the solution filtered, and supersaturated with diluted hydrochloric acid. An abundant precipitate of a dark red flocculent matter is thus obtained, which is to be washed with distilled water until chloride of potassium or ammonium ceases to be removed. The precipitate is then dried at from 240° to 300° Fahr., in a stove. This constitutes the new acid, which the author proposes to call *sorbinic acid*. It is amorphous, of a deep red colour, insoluble in water, in spirit, and in weak acids, but very soluble in potash, soda, or ammonia, with which it forms solutions of a rich sepia colour. A trace of sorbine is sufficient to communicate a sensible colour to a large quantity of alkaline water.

The soluble salts of lime, baryta, alumina, iron, tin, gold, and platinum, form, with a soluble sorbinate, voluminous precipitates of a reddish-yellow colour more or less intense. Sulphate of copper yields a yellowish-green precipitate, which is soluble in ammonia, forming a deep green coloured solution.

The analysis of sorbinic acid gave the following results:—

Carbon	57.96
Hydrogen	5.51
Oxygen	36.53
	100.00

Sorbinate of lead was found to contain

Oxide of lead	51.35
Sorbinic acid	48.65
	100.00

Ascribing to the acid the formula C_{12} H_{13} O_{10}, the salt of lead would be represented by the formula

(3 Pb O, C_{12} H_{13} O_{11}).

Sorbine crystallizes in octahedrons which belong to the right prismatic system.

M. Berthelot, to whom the author submitted a specimen with the view of having it examined in reference to its optical properties, has ascertained that it influences the plane of vibration of a ray of polarized light, turning it to the left, and that it possesses this property to a degree intermediate between that possessed by solution of sugar which has been altered by acids, and the same solution after the crystallizable portion has been separated.—*Journal de Pharmacie.*

ON THE TRANSFORMATION OF MANNITE INTO SUGAR.

BY M. LIEBERMITE.

The existence of a slight excess of hydrogen in relation to the oxygen constitutes the essential difference in the elementary composition of mannite as compared with sugar. On considering the affinities which connect these vegetable principles, we might expect, under certain conditions, to find one of them transformed into the other. This transformation does not appear to have been hitherto studied.

Fresh and perfectly pure manna does not undergo alcoholic fermentation, but after a lapse of some time it is liable to a peculiar alteration. It changes from a white, opaque, dry and almost friable substance, to that of a reddish, translucent, and gluey substance. It is then sufficiently hygrometric to dissolve in the water which it derives from the atmosphere; and this solution, with the addition of yeast, soon becomes converted into alcohol and carbonic acid.

The preceding explains the reason why sugar is found in manna. If, under an oxydizing influence, mannite is convertible into sugar, there can be no doubt that it may also be produced by the action of deoxidizing agents on the sugar itself; it is thus that it is formed in the juice of beet-root submitted to viscous fermentation.—*Comptes Rendus.*

ON THE PREPARATION OF PURE BARIUM COMPOUNDS.

BY HENRY WURTZ.

The preparation of the compounds of barium in a state of absolute purity is a subject which has not generally received much attention from Pharmaceutical Chemists, in consequence of the hitherto limited application of these compounds, except in chemical analysis. The time, however, is undoubtedly close at hand when new developements in the arts will create a demand for pure barium compounds, as well as for very many other products now considered as pertaining exclusively to the laboratory. Indeed, efforts have already been made to introduce the *chlorate of*

barytes to the notice of pyrotechnists as a means of producing a green fire unequalled in beauty, and the pure carbonate has been for some time in use in England, in the manufacture of superior varieties of plate and flint glass. The precipitated or purified native sulphate is also preferred as a water-colour pigment to white lead, being far more durable than the latter. I may here be permitted to mention a practical application of the carbonate which has occurred to myself. I have found that sulphate of lime is totally precipitated from its solution by mixing therewith an equivalent quantity of the precipitated or finely pulverized natural carbonate of barytes, of course with the formation of sulphate of barytes and carbonate of lime. It is by no means improbable that this property may be made available in removing sulphate of lime from spring or sea-water which is to be used in steam-boilers, thus preventing the formation of the troublesome incrustation which so often occurs, especially when it is considered that the sulphate of barytes which would be formed might easily be reconverted into carbonate and used over again. Again, sulphate of lime might be removed in the same way from the brine in salt-works, thus contributing to the purity of the salt produced.

Recent improvements in chemical analysis have greatly increased the usefulness of barium compounds in the laboratory, especially of the carbonate, to which the late investigations of Professor H. Rose, and of Ebelmen, have given a place in the very first rank among the reagents valuable to the Chemist. Any suggestion, therefore, concerning the preparation of barium compounds in a pure state, cannot be considered as useless.

The sulphate of baryta is the only compound which occurs in sufficient abundance to be an economical source of the other barium compounds, and the enormous though illegitimate use of this substance in the adulteration of white lead, is so far fortunate as to render it an easy matter to obtain it in any required quantity, already in a state of fine powder, which is so desirable in chemical operations.

The sulphate of baryta is always reduced to the state of sulphide of barium, by exposing it to a red heat in intimate admixture with some carbonaceous substance, such as powdered charcoal, rosin, oil, or flour. It is exceedingly difficult, however, if not impossible, to effect in this manner a complete decomposition of the sulphate. Indeed, it is probable that in most cases the quantity of sulphide obtained is not more than half that which is equivalent to the sulphate employed. A modification which promises to be far more economical was proposed by Dr. Wolcott Gibbs. His proposal was to submit the sulphate to the action of a current of common coal gas at a red heat. It is evident that in this way a perfect decomposition may readily be accomplished, especially if the powdered sulphate is stirred during the operation, so as to expose fresh surfaces to the action of the gas.

The mass obtained after the reduction of the sulphate is submitted to the action of boiling water, and a solution obtained, which, according to Professor H. Rose,* contains principally hydrate of baryta and sulphohydrate of sulphide of barium Ba S. HS. formed by the reaction of equal equivalents of water and proto-sulphide of barium. It almost invariably contains also a quantity of lime, probably in the form of sulpho-hydrate of sulphide of calcium, or of hydrate of lime, proceeding from the almost constant concurrence of sulphate of lime with native sulphate of baryta. From the presence of this lime originates the principal difficulty in preparing pure barium compounds from this substance. Thus, when the carbonate is prepared from the solution by precipitation with carbonate of soda, or a current of carbonic acid gas, it is found contaminated with carbonate of lime, which is fatal to its use as a reagent in analysis. Also in examining many specimens of commercial *chloride of barium*, which is prepared from this solution by the addition of chloro-hydric acid, boiling to separate sulpho-hydric acid gas which is evolved, filtration to separate the sulphur which is precipitated and crystallization, I have always found it to contain a small quantity of chloride of calcium, which I have found it impossible to separate entirely by repeated recrystallizations. It has been proposed† to separate the chloride of calcium from chloride of barium by the use of very strong alcohol, in which the latter when anhydrous, is insoluble. This method is rather expensive and troublesome, as it involves the evaporation to dryness of the chloride of barium solution, the reduction of the previously ignited residue to a very fine powder and digestion in strong alcohol. Attempts were made, after some previous experimentation, in which it was found that an aqueous solution of *oxalate of baryta* precipitated chloride of calcium, but not chloride of barium, to separate the lime from a chloride of barium solution by addition of oxalate of baryta, or simply of a little oxalic acid, but it was soon found that oxalate of lime was somewhat soluble in a solution of chloride of barium, so that a solution of oxalate of baryta gave no precipitate in a mixture of solutions of chloride of barium and chloride of calcium. It was found also that the precipitate formed by a little oxalic acid in a lime solution could be re-dissolved by addition of chloride of barium. It may also be mentioned, though irrelevant to the subject, that it was found that oxalate of lime was soluble in solutions of chloride of calcium, of ammonia, and of chloro-hydrate of ammonia.

* Poggendorff's *Annalen*, 55,416. † Gmelin's *Handbook*, 2158

The well-known property of carbonate of baryta, which the recent investigations of Professor H. Rose have rendered so important in the analysis of phosphates, of completely precipitating lime from its solution by a sufficiently long contact therewith, furnishes us, however, with a perfectly easy and cheap method of purifying the chloride of barium solution. In fact, a solution of chloride of barium to which chloride of calcium has been added, having been treated with a little carbonate of baryta, and allowed to stand in contact with it for two days, with occasional agitation, was found on filtration to be free from lime. The only objection to this method is the considerable length of time required; but I must here describe an elegant modification which was communicated to me by Dr. Wolcott Gibbs, and tested by him in his laboratory; that is to add first to the solution of chloride of barium containing lime a little solution of hydrate of baryta, and then to pass through it a current of carbonic acid gas. The precipitate immediately formed contains of course all the lime.

The only impurity which is prevalent in commercial chloride of barium besides lime, is, strangely enough, a trace of *lead*, which is almost always present, and sometimes in such quantity that the solution is immediately blackened by sulphuric acid.* This is, however, very easily removed, either before or after the separation of the lime by the process of Dr. Gibbs, by passing a little sulpho-hydric acid gas into the solution, gently heating for a short time and filtering.

Commercial chloride of barium thus purified is probably the most convenient source of the other compounds of barium when required pure. Thus pure carbonate of baryta may be prepared from it by precipitation with carbonate of ammonia, or with carbonate of soda, which is free from silicia, sulphuric acid, and phosphoric acid.—*New York Journal of Pharmacy.*

ON A CLASS OF AMMONIACAL COMPOUNDS OF COBALT.

BY FREDERIC CLAUDET.†

When ammonia is added in excess to a solution of protochloride of cobalt mixed with four times its weight of chloride of ammonium, the solution becomes of a dark brown colour without any appearance of a precipitate. In this state the solution rapidly absorbs oxygen from the air; and on frequently agitating a bottle half filled with it, removing the stopper from time to time to renew the air, the absorption is much facilitated, and is complete in the space of three or four days, the colour of the liquid changing at the same time from a dark brown to an intense violet-red. If the air be replaced in this experiment by pure oxygen gas, the oxidation is still more rapid, and may be completed (if the quantity of solution be not too large) without requiring the removal of the stopper. By boiling this oxidized ammoniacal solution, strongly acidified with hydrochloric acid, a heavy crimson powder is deposited. A slight effervescence takes place at the same time, due to the evolution of a certain quantity of oxygen, and the liquid becomes nearly colourless, owing to the precipitation of the whole of the cobalt in the form of a new compound. The liquid when cold is drawn off from the red powder, which is washed several times by decantation with distilled water, thrown on a filter, and allowed to dry in a warm chamber. The precipitated powder thus obtained is nearly pure. Before examination it is, however, necessary that it should be crystallized. The powder for this purpose is

* It may be that leaden pans are used for the evaporation or crystallization of the commercial chloride of barium, which would sufficiently account for the presence of lead in the product.

† *Phil. Mag.* [4] II., 253.

dissolved in boiling water, to which a few drops of hydrochloric acid have been added; and on cooling, the salt is deposited in the form of regular octohedrons, small, sparkling, and of a ruby-red colour, very much resembling small crystals of chrome-alum.

This salt, which is an intense colouring matter, is sparingly soluble in cold water, one part requiring at 60° Fahr. 244 parts of water; it is soluble to a much larger extent in water at the boiling-point, to which it imparts a very deep red colour; it is, however, slightly decomposed, and altogether so on boiling the solution; but this may be prevented by keeping the solution slightly acid with hydrochloric acid.

Hydrochloric acid, and saturated solutions of chloride of ammonium and sodium, completely precipitate the new salt from its solution; alcohol acts in the same way. The salt is not decomposed by boiling hydrochloric acid. Sulphuric acid evolves hydrochloric acid, a corresponding sulphuric salt being formed; the reaction, however, is not complete, for at the end of the operation chlorine comes off from some decomposition. Nitric acid partially transforms the salt into the nitrate of the base. Potash and soda decompose the solution of the salt, a hydrated peroxide of cobalt being thrown down and ammonia evolved in considerable quantity. Hydrate of baryta decomposes the salt in the same way with the aid of heat, but not in the cold. Carbonate of potash or soda has no effect. Yellow prussiate of potash gives with a solution of the salt a dirty brown precipitate, red prussiate none; but on standing, bright yellow needles crystallize from the solution.

Sulphuretted hydrogen precipitates the whole of the cobalt as a bisulphide of that metal, ammonia being liberated at the same time. The analysis of three different preparations of this sulphide gave—

	Calculated.		Found.		
			I.	II.	III.
Cobalt	29.5	47.96	48.9	49.5	48.2
Sulphur	32.0	52.04	51.1	50.5	51.8
	61.5	100.00			

On boiling a solution of the new salt, it is decomposed into ammonia, which escapes, and a superior hydrated oxide of cobalt, containing a certain amount of a nitride of cobalt which is precipitated, nothing but chloride of ammonium remaining in solution. The composition of the precipitated oxide of cobalt appears to be $Co_3 O_4 + 3HO$.

Dried in the air, the salt contains no water of crystallization, neither does it contain oxygen. When heated to low redness in a glass tube, a large quantity of ammonia is disengaged, a certain quantity of chloride of ammonium sublimed, and a residue of common protochloride of cobalt remains. In this reaction, no moisture is produced, which would necessarily be formed if any oxygen existed in the compound.

The analysis of this salt was effected in the following manner:—The chlorine was estimated from the chloride of silver, obtained on boiling the solution with an excess of nitrate of silver and nitric acid. In the cold, the precipitation by nitrate of silver is not complete. The cobalt was determined by reducing a certain quantity of the substance introduced into a tube with a bulb, by pure hydrogen and heat. The nitrogen was estimated as ammonia, by distilling the salt with caustic soda, receiving the ammonia into hydrochloric acid, and determining the weight of the double chloride of platinum ammonium. The ammonia was also obtained by heating the salt with soda-lime, according to the method of Will and Varrentrapp. This last process, however, gave less accurate results, a deficiency of about one per cent. in the nitrogen being found. The hydrogen was determined by combustion of the salt with a mixture of oxide of copper and chromate of lead, and copper turnings.

The number of equivalents of chlorine, cobalt, nitrogen, and hydrogen thus determined, are 3Cl, 2Co, 5N and 16H:—

	Calculated.		Found.		
			I.	II.	III.
3Cl =	106.5	42.35	42.22	42.38	42.25
2Co =	59.0	23.46	23.63	23.50	23.66
5N =	70.9	27.83	27.20	27.79	
16H =	16.0	6.36	6.31	6.34	6.46
	251.5	100.00			

The salt containing a large quantity of chlorine, it might be expected that the volatilization of minute quantities of chloride of copper or chloride of lead in the combustion would give an increase in the results for the hydrogen, one equivalent of the latter making a difference of only 0.37 per cent. The results obtained, however, agree pretty well together; and as they do not differ much from the calculated numbers, it is highly probable that sixteen is the true number of equivalents of hydrogen in the salt; and this view is further confirmed by the manner in which the salt is decomposed by heat. A combustion-tube about two feet long was closed at one end and bent at right angles within about half an inch of the closed end, so as to form a kind of retort. A certain quantity of the salt was rubbed into a paste with a little water and rolled up into the size of a pea. When quite dry, this was dropped into the tube and made to enter the small retort; mercury was then gently poured into the tube, which was gradually filled and then inverted in a mercurial trough. The mercury descended about a quarter of an inch in the tube, on account of a small quantity of air which remained in that portion containing the salt. The retort part of the tube was now slowly heated by means of a spirit-lamp until the salt was entirely decomposed. The gas produced occupied nearly the whole of the tube, which was two feet in height. On allowing the tube to cool, and introducing a small quantity of hydrochloric acid, the whole of the gas was absorbed, with the exception of a column of about three-quarters of an inch in height, showing that the space above the mercury was entirely composed of ammoniacal gas. Now, the decomposition of this salt into no other gas than ammonia, and no other solid products than chloride of ammonium and protochloride of cobalt, is only compatible with a certain number of atoms of hydrogen, which is sixteen; for—

$$3Cl, 2Co, 5N, 16H = 2CoCl + NH_4Cl + 4NH_3$$

Had there been one or two equivalents less of hydrogen, one equivalent of ammonia would have been broken up, giving hydrogen and nitrogen not condensed by the hydrochloric acid.

Assuming, then, the above number of atoms to be correct, and applying Berzelius's theory of the copulated compounds, the formula of this salt may be written—

$$3(NH_4Cl) + 2(NH_2Co);$$

that is a compound of three equivalents of chloride of ammonium with two equivalents of ammonia in which one atom of hydrogen is replaced by cobalt. In fact, the salt has the characters of such conjugate compounds. It has the properties of chloride of ammonium with regard to form and taste; while, on the other hand, the basic properties of the two equivalents of ammonia have totally disappeared, the salt being quite neutral to test-paper. This compound is analogous to the remarkable platinum compounds discovered by Gros and Reiset: but with this difference, that it is a sesqui-conjugated compound, if it may be so called, being composed of three equivalents of the salt united with two equivalents of the adjunct.

Another way of grouping the atoms of this compound is the following, proposed by Mr. Graham:—

$$Cl_3 \begin{cases} NH_3, Co_2 \\ NH_3, NH_4 \\ NH_3, NH_4 \end{cases}$$

Here $NH_2 Co_2$ represents an ammonium in which two equivalents of hydrogen are replaced by two equivalents of cobalt; while $NH_3\ NH_4$ represents an ammonium in which one equivalent of hydrogen is replaced by ammonium itself, as the hydrogen of ammonia is replaced by ethyl, methyl, &c., in Wurtz's and Hofmann's bases. Or

$$Cl\,N \begin{cases} H_2 \\ Co_2 \end{cases} + 2Cl\,N \begin{cases} H_3 \\ NH_4 \end{cases}$$

The compound would then be viewed as a double salt, composed of one equivalent of a chloride of cobalt-ammonium and two equivalents of a chloride of ammonium, in which the fourth atom of hydrogen is replaced by ammonium.

This peculiar compound has the property of forming double salts with bichloride of platinum and protochloride of mercury.

Double salt with bichloride of platinum.—On adding a warm solution of the salt to bichloride of platinum in excess, a silky crystalline buff-coloured precipitate falls down, much less soluble than the salt itself: it may, therefore, be washed with water, thrown on a filter and dried.

Twelve grains of this double salt were fused with carbonate of soda, dissolved in hot water and filtered, to separate the platinum and oxide of cobalt. The solution neutralized with nitric acid and precipitated with nitrate of silver, gave 20.11 grs. Ag Cl=4.975 Cl=41.6 per cent. The filtrate of platinum and oxide of cobalt, after being ignited, was treated with boiling hydrochloric acid, which dissolved out the cobalt, and left 4.05 platinum=33.75 per cent.

18.59 grains of double salt reduced by hydrogen gave 8.06 mixed metals=43.35 per cent., giving 9.60 per cent. for the cobalt. The double salt is consequently composed of one equivalent of the new compound and two equivalents of bichloride of platinum.

	Calculated.		Found.
5Cl	=248.5	42.12	41.60
2Pt	=256.2	33.43	33.75
2Co	= 59	10	9.60
5N	= 70		
16H	= 16		

The formula of which is—

$$Cl_2 \begin{cases} NH_2Co_2 \\ 2(NH_3NH_4) \end{cases} + 2PtCl_2$$

When the salt is decomposed by heat, treated with nitro-hydrochloric acid, and the excess of acid driven off by heat, the solution crystallizes in large, orange-brown, prismatic tables, no mother-liquor remaining. This salt proves to be a double chloride of platinum and cobalt, the two equivalents of bichloride of platinum combining with two equivalents of protochloride of cobalt from the new compound.

Double salt with protochloride of mercury.—Prepared in the same way as the preceding double salt, by adding a warm solution of the cobalt-salt to an excess of protochloride of mercury, a bulky silky precipitate is formed, composed of small red needles. This may be collected on a filter, slightly washed with cold water, and recrystallized from a warm solution, the double salt being tolerably soluble in hot water.

Fifteen grains fused with carbonate of soda in the same way as the double platinum-salt, gave 18.10 grs. Ag Cl=4.477 Cl=29.84 per cent.

14.16 grs. reduced by hydrogen gave 0.10 cobalt=5.65 per cent.

	Calculated.		Found.
2Cl	=319.5	30.00	29.84
6Hg	=600		
2Co	= 59	5.54	5.65
5N	= 70		
16H	= 16		

This double salt contains, therefore, for one equivalent of the cobalt compound, six equivalents of protochloride of mercury.

$$Cl_2 \begin{cases} NH_2Co_2 \\ 2(NH_3NH_4) \end{cases} \quad 6HgCl.$$

Recently prepared oxide of silver throws down the chlorine from the new ammoniacal compound, a highly alkaline red solution remaining, not having the slightest odour of ammonia. On standing for a few hours it decomposes, ammonia is evolved, and hydrated peroxide of cobalt precipitated. The compound in solution represents, before changing, the base of the present class of salts. It is an oxide, of which the composition is the same as that of the chloride already described, with the substitution of three equivalents of oxygen for three equivalents of chlorine:—

$$\text{Formula of new cobalt base.....} O_3 \begin{cases} NH_2Co_2 \\ NH_2NH_4 \\ NH_2NH_4 \end{cases}$$

The study of this and other allied compounds of cobalt which exist, will no doubt greatly extend our views respecting the compound ammonias.

The chlorine of the original chloride may also be eliminated by any silver-salt, an analogous cobalt-salt containing the acid of the silver-salt being formed, and remaining in solution. In this way, a sulphate, nitrate, oxalate, acetate, and carbonate of the new base have been obtained. From the carbonate, the author has prepared the bromide and iodide, which have the octohedral form of the chloride, are just as sparingly soluble in water, and of a still darker ruby colour. The bromide was found to contain 61.15 per cent. of bromine, the calculated amount being 61.8 per cent.

The insolubility of this ammoniacal compound of cobalt in boiling hydrochloric acid may be advantageously turned to account in the preparation of chemically pure cobalt, and also in the qualitative examination of substances containing small quantities of cobalt. The pulverized ore, or its oxide to be purified, is dissolved in nitro-hydrochloric acid, diluted with water, and filtered in order to separate any gangue or insoluble residue. Chloride of ammonium is now added in large excess, and the liquid saturated with ammonia; it is then poured into a glass bottle, and oxidated in the way already described in the preparation of the new salts. During the oxidation, a certain quantity of the new compound is deposited, especially when the solutions are rather concentrated, on account of its insolubility in a strong solution of chloride of ammonium. The solution still retains a certain quantity of cobalt-salt; it is therefore boiled with a considerable excess of hydrochloric acid, which causes the total precipitation of the new compound, dissolving at the same time any oxide of iron or other oxides thrown down by the ammonia. When cold, the clear liquid is decanted off, and the deposit well washed with acidulated water and then dried. By heating this compound to low redness, it is decomposed, leaving for residue protochloride of cobalt slightly decomposed, but absolutely free from any other metal. This may be reduced by hydrogen gas, giving pure metallic cobalt.

By these means the author has been able to prepare perfectly pure cobalt directly from the grey cobalt ore of Tunaberg, which is an arsenio-sulphide of cobalt, and also to detect small quantities of cobalt in different samples of oxide of nickel.

The preceding results embody the most definite conclusions of an investigation of the ammoniacal salts of cobalt which Mr. F. Claudet has had in hand for the last two or three years. M. Frémy has also lately announced that he is occupied with an extended inquiry into the same class of compounds, respecting which he has published some important general results.* Dr. A. Genth† appears also to have formed several of the salts of the new base above described, but his analytical results differ entirely from those given in the present paper.—*Quart. Jour. of the Chemical Society.*

ON THE PREPARATION OF IODOFORM.

BY MM. CORNELIS AND GILLE.

Although several processes have been described for obtaining iodoform, the following has not yet been published, and as a new fact it may aid those who engage in the investigation of this body. It is as follows:—

Dissolve eight parts of iodide of potassium in 100 parts of spirit containing ninety per cent. of alcohol; heat the solution to from 95° to 104° Fahr., and then add, in small quantities at a time, a solution of chloride of lime ($CaO, ClO+CaCl$); part of the iodine will be immediately set free, and will give to the liquor a deep red colour. It is to be agitated until it is nearly decolourized, and fresh portions of chloride of lime are then to be added, repeating the operation as long as the phenomena indicated continue to occur. When on the addition of the chloride the liquor ceases to become coloured, it is to be allowed to cool, and in a little while a yellowish-white flocculent matter will be deposited, consisting of iodoform and iodate of lime. The precipitate is to be collected and treated with boiling spirit, containing ninety per cent. of alcohol, which will dissolve the iodoform and deposit it in crystals as it cools.

The formation of this product may be represented by the following formula:—

$$2\,(C_4\,H_6\,O_2)+8\,(CaO,\,ClO+CaCl)+3\,KI=3\,(CaO,\,C_2\,HO_2)+13\,CaCl+3\,KCl+C_2\,H\,I_3+8\,HO.$$

The iodate of lime results from the decomposition of part of the hypochlorite of lime and iodide of potassium, as shown in the following formula:—

$$3\,(CaO,\,ClO+CaCl)+KI=CaO,\,IO_5+CaCl+KCl.$$

The chloride of lime may be replaced, in this preparation, by chloride of potash or soda, but these latter, in addition to their higher price, have the further inconvenience of forming a greater quantity of iodate than the chloride of lime.—*Journal de Pharmacie d'Anvers.*

* *Compt. Rend.*, April 7, 1851, and May 26, 1851.
† *Chem. Gaz.*, 1851, 286.

NEW MODE OF SEPARATING PHOSPHORIC ACID.

BY M. ALVARO REYNOSO.

This method is founded on the insolubility of the phosphate of binoxide of tin in nitric acid, while all the other phosphates are soluble. The process is as follows:—Pure tin is taken (the tin of commerce ought not to be used until it has been previously ascertained how much stannic acid it yields), a quantity having been weighed, is introduced with the phosphate into a small flask; nitric acid in excess is added and made to boil. When all the tin has been attacked, it is filtered, the precipitate is washed, and heated to redness in the flame of a spirit-lamp. It is now weighed, and the weight of the stannic acid which the tin employed would produce, is deducted; the excess of weight beyond this represents the phosphoric acid present.

It is necessary to observe certain precautions, the omission of which might lead to error.

1st. It is necessary to avoid all conditions calculated to effect the reduction of the metallic oxide. Thus, in burning the filter, a few drops of nitric acid should be added, and if the combustion be effected over the flame of a lamp, the flame should not be allowed to enter the capsule. If that should have occurred, it may be remedied by the addition of a little nitric acid, but another error may now arise from projection. In any case it may be ascertained whether any reduction has taken place by examining the colour of the precipitate, which should be of a pale yellow, but acquires a brownish colour when reduction has taken place.

2nd. The compound which phosphoric acid forms with binoxide of tin, very readily absorbs moisture, therefore the precipitate should be weighed immediately after calcining it.

The value of this process may be readily tested by putting some phosphate of soda into a small flask, with an excess of tin, and boiling it with nitric acid diluted with an equal volume of water, and adding chloride of calcium to the filtered liquor previously neutralized with ammonia, when no precipitate will be formed.

The author gives the results of many analyses, which indicate the great accuracy of this method of determining phosphoric acid.—*Journal de Pharmacie.*

PREPARATION OF PURE METHYL-ALCOHOL.

BY F. WÖHLER.

It is known how very difficult it is to obtain pure methyl-alcohol from crude wood-spirit. The following method, founded upon the crystallizability of the oxalic methyl-ether, appears to be the most convenient for its preparation, at least in small quantities.

A quantity of crude wood-spirit is gradually mixed so as to prevent over heating, with an equal weight of concentrated sulphuric acid. The brown mixture is then submitted to distillation, in a tubulated retort, with two parts by weight of superoxalate of potash. It might be advisable to let the mass stand for twenty-four hours before distilling. A volatile and combustible fluid first passes over and is followed by oxalic ether, which begins to condense in the neck of the retort. The receiver is then removed, and the distillation continued, as long as any oxalic ether passes over, the disengagement of which is assisted by gently heating the tube. It is then pressed strongly between folds of blotting-paper and freed from any small quantity of adherent volatile products, either by placing it over sulphuric acid or by a protracted fusion. In this manner it may be immediately obtained quite colourless. The combustible fluid which first passes over contains some diluted oxalic ether, which may be crystallized by evaporation at a moderate heat. The rough wood-spirit employed by me in the experiment was so impure that, when mixed with water, it became milky, and it produced in this manner more than one-quarter of its weight of pure oxalic ether.

In order to prepare methyl-alcohol from oxalic ether it will be best to distil it with water only, which process, it is known, transforms it into oxalic acid and methyl-alcohol. In distilling it with dry hydrate of lime it will not be decomposed, and in distilling it with a concentrated lye of potash its decomposition is only partial, because then a methyl-potash salt is formed, which is most difficult to dissolve, and which is now under closer examination.—*Ann. d. Chem. und Pharm.*, Bd. lxxxi.

ON THE EXAMINATION OF OINTMENTS CONTAINING OXIDE OF MERCURY.

BY M. BOBIERRE.

Having had occasion to examine some citrine ointments employed by a woman who was accused of illegally practising medicine, I experienced some difficulty in ascertaining the chemical characters of the metallic substance present, in consequence of the small proportion of it contained in the ointment, and also in consequence of the ointment being very old. The following method of operating proved so successful, that I am induced to record it for the benefit of those engaged in such investigations. It serves to isolate mercury in a few minutes from its combination with oxygen and fatty acids. However small the quantity of mercury present may be, the effect is, nevertheless, distinct.

The ointment to be examined is melted by the application of a gentle heat, and a small quantity of essence of citron is then added to it. Under the well-known reducing influence of this hydro-carbon, the ointment acquires a grey colour, which effect is to be promoted by agitation. After about five minutes, the ointment being still kept melted, three times its volume of ether is to be added, the whole mixed together, and then allowed to stand. The supernatant liquid is then to be decanted, and the residue washed several times with ether. The mercury left at the bottom of the vessel may now be dissolved in nitric acid, and tested with the usual reagents. —*Journal de Chimie Médicale.*

AN EASY MODE OF DECOMPOSING AMMONIA, AND PRODUCING PURE HYDROGEN, APPLICABLE FOR THE REDUCTION OF METALLIC OXIDES.

BY M. BONFILL.

It is well known that ammonia requires a temperature above that of a red heat in order to effect its decomposition, and even then the decomposition is never complete. In order to effect complete decomposition it has been found necessary to employ a succession of electric sparks, heat alone being insufficient whatever the temperature may be.

I have ascertained, nevertheless, that ammonia is easily and completely decomposed by heat at a temperature below that of a red heat, if it be made to pass through a porcelain tube filled with quick lime. In order to ensure the absence of water and carbonic acid from the lime, I keep the latter at a red heat for more than half an hour; the heat is then lowered by removing the fuel from about the tube, and when the tube ceases to be visibly hot, dry ammoniacal gas is passed through it, which is immediately resolved into nitrogen and hydrogen.

If the gas be merely passed through the porcelain tube very little decomposition takes place, for although a few bubbles of hydrogen and nitrogen are obtained, the greater part of the ammonia remains unaltered. Nearly the same result also occurs when fragments of porcelain are put into the tube to increase the points of contact with the gas, as proposed by Schæde and Berthollet.

In order to multiply the points of contact, I commenced by charging the tube with lime, first in fragments, then in coarse powder, and, lastly, in fine powder. In order to ensure a free passage for the gas the powder was arranged in the manner usually adopted in organic analysis. It was thus that I proved by several operations that the ammoniacal gas could be decomposed.

By this easy mode of decomposing ammonia by heat, hydrogen may be obtained for those applications in which it is required in a state of chemical purity, provided the presence of nitrogen does not interfere. The hydrogen thus obtained is especially applicable for the reduction of metallic oxides by Rivot's method, the nitrogen in this case offering no obstacle. Hydrogen obtained in the usual way always contains other gases, arising from the presence of arsenic, antimony, and sulphur in the zinc employed, besides the vapours of the very volatile liquid carburets of hydrogen, the complete separation of which is more difficult than that of the hydrogen compounds of the other three bodies named. It results from this that when a metal is reduced by Rivot's method with hydrogen prepared in the usual way, it will always contain a greater or less quantity of carburet, which it would be necessary to take into account in analytical operations.—*Comptes Rendus.*

EXTRACTS FROM THE MINUTES OF EVIDENCE ON THE PHARMACY BILL.

Douglas Maclagan, M.D., F.R.S.E., called in; and examined.

Chairman.] I believe you are a Medical Practitioner?—I am. I am a Physician though a Fellow of the College of Surgeons; we combine both in Edinburgh.

And you are a lecturer on materia medica?—Yes.

Where?—In the Extra-Academical School of Edinburgh.

Have you been many years engaged in lecturing?—I think it was in the year 1839 that I first lectured; thirteen years ago.

Your pupils, I presume, are chiefly medical students?—Chiefly, but not all.

Have you ever had pupils from the chemists and druggists?—I have.

I believe you heard the evidence yesterday?—I did.

Do you agree with the opinions which were then expressed respecting the condition of the chemists and druggists, with regard to qualification?—I do not at all agree with the general tone of the evidence given yesterday.

Do you think the chemists and druggists are not sufficiently educated, taking them as a body?—Very decidedly so.

Have you turned your attention to the subject, so as to have the means of forming a judgment upon it?—Yes, I think I have had very fair means of forming a judgment on the matter.

Have you attended to it for some time past?—For some time past.

And have you ever made any propositions on the subject?—I have expressed my sentiments on the subject in print.

Could you refer to any instance?—Yes, I could read to the Committee sentiments expressed by myself on the subject.

On what occasion?—On the occasion of writing an article in one of the medical journals in 1839.

Will you favour the Committee with the substance of what you expressed on the subject upon that occasion?—The subject that I was alluding to in writing here, was an object that I had often thought a desirable one; having a national pharmacopœia instead of one for each of the three divisions of the United Kingdom. I was pointing out the propriety, as I thought, of accomplishing it, and it was in relation to that that I made the following observations which, with your permission, I will read to the Committee. I was referring to the advantage that might be derived from the assistance of the practical pharmaceutical chemists and druggists being given to the Colleges of Physicians, whose function it is to prepare the pharmacopœias, and expressing a hope that a better work would result from their combined efforts. The following is what I have written:—"But before we can hope for much aid from this quarter, we must have a higher standard of qualification for those who are engaged in the practice of pharmacy. This is to be obtained only by obliging all those who intend to follow this occupation to go through a prescribed course of education, and to undergo a regular examination before a competent board, in order to obtain a license to act as chemists and druggists." . . . . "An objection very likely to be urged is, that under the present system we have plenty of good apothecaries" (I use the word "apothecaries" here in the sense of pharmaceutical chemists, not in the sense in which that word is used in England), "who can perform the processes of the pharmacopœia successfully, and make up our prescriptions well and accurately. To the truth of this we at once subscribe; but we are not satisfied with so meagre an amount of usefulness. We wish our chemists and druggists to be able, not only to follow, but to forward the art of pharmacy; not to serve the physician, but to co-operate with him; not to be merely merchants trading in medicinal substances, or artisans engaged in preparing them, but to take their place as members of a distinct and most important division of the medical profession. It is, we believe, to the want of a proper standard of qualification in our apothecaries that we must, in a great measure, attribute the smallness of the amount of pharmaceutical invention or discovery which has emanated from Great Britain. Compare the state of matters here with what obtains on the Continent. Here any one may set himself up as a chemist and druggist who has funds to provide himself with a shop and stock

of medicines, no matter how destitute he may be of any thorough knowledge of the sciences which bear upon his occupation; no matter how small may be his acquaintance with the language and meaning of physicians' prescriptions." Then follows a short statement of the state of education in France, and then the following occurs. "Now the result of this system has been, that, on the Continent, pharmacy has made rapid advances, whilst comparatively little has been done for it in Britain. The most interesting discoveries, and the most important improvements in this department, have been imported to us from abroad. There are two excellent Continental journals, the *Journal de Pharmacie*, and the *Annalen der Pharmacie*, the chief contributors to which are derived from the class of pharmaciens with which we have nothing at all in the department of pharmacy to compare; and we search in vain among our pharmaceutists for names as distinguished in science as those of Sertuerner, Buchner, Robiquet, Pelletier, Guibourt, &c. We hope, however, that this important subject will ere long attract the attention of the Legislature, and that we shall soon have our chemists and druggists as regularly taught, examined, and licensed as our physicians, surgeons, and general practitioners."

That was your opinion in what year?—1839.

Had you previously to that considered the subject at all?—I had been considering the subject since I was a student, because I intended to lecture on materia medica; and therefore all the subjects connected with it were always forcing themselves on my attention.

Have you reason to believe that the subject has been entertained by the medical corporations of Edinburgh and Glasgow in reference to Mr. Warburton's inquiry?—Yes, I have reason to believe that that was the case, though I cannot speak officially of the matter, not having been mixed up with that inquiry.

Have you reason to believe that some evidence was given on the subject, which evidence was burnt at the fire of the House of Commons?—I am not sure whether what I am going to mention to the Committee was given in evidence, but I know at least that it was entertained and talked of among Fellows of the Colleges of Physicians and Surgeons and the representatives of the University of Edinburgh, conferring together in 1834. I know it was talked of, and that it was under discussion; to that extent I can speak.

Was any proposition reduced to a tangible form on this subject?—I find that that was the case.

Could you state what the nature of that proposition was?—I may state that, in searching for another purpose through some papers connected with this subject, in the possession of my father, who was one of the witnesses examined before Mr. Warburton's Committee, I found a document which shows that this subject was under consideration at the conference to which I have alluded.

In what year was that?—In 1834.

Will you read to the Committee that portion which relates to chemists and druggists?—Yes.

What is the title of the document?—"Propositions agreed on by the Medical and Surgical Professors in the University, the Royal College of Physicians, and the Royal College of Surgeons of Edinburgh. March, 1834."

That is the title of the document?—Yes.

We have nothing to do with that part of it which relates to the medical profession, but will you state what was the idea entertained on the subject of chemists and druggists?—I find at the end there is a section "Of chemists and druggists" (these are in the form of resolutions). "That provision should be made in regard to chemists and druggists, for their being found sufficiently qualified to compound, prepare, and dispense medicines; and that no persons ought to obtain licenses to act as such who have not, firstly, attended at least one full course of lectures on chemistry, botany, materia medica, and pharmacy, by recognised teachers; secondly, been employed for two years in compounding and preparing medicines, under a licensed general practitioner, or licensed chemist; and thirdly, given proof of having had opportunity to acquire a competent knowledge of the Latin language. That previously to obtaining such licenses, the candidates should undergo an examination on chemistry, botany, materia medica, and pharmacy, and as to their knowledge of the Latin language. That those persons only who have gone through the specified education, and passed this examination, should be entitled to the name of licensed or approved chemists or druggists, or to such other designation as may imply their

qualifications; but that the license granted to them should infer no right to exercise the duties of general practitioners."

Do you consider that the principle of those resolutions is almost identical with the principle of this Bill?—It appears to me to be the very principle embodied in the Bill.

And that principle was under discussion between the bodies you have named as early as 1834?—It is obvious that it must have been so from that document.

Did you receive that document direct from your father?—I did.

Do you recognise it by the handwriting?—I cannot recognise that portion of the handwriting, but I see a part at the end is in the handwriting of the late Mr. Small, a clerk in the University, and a docket at the back is by Professor William Thomson, of Glasgow, who had something to do with the conference at that time. I beg it to be understood that what I say is, that I see from that document that the thing was under consideration at that time.

Sir *W. G. Craig.*] You are not aware whether these propositions were actually agreed on by the different bodies or not?—No, I do not know; the document only shows that the subject was under discussion.*

Chairman.] And the proposition which was then under discussion was similar in principle to that which is now put into the form of a Bill?—Certainly.

You have said you have reason to believe there is a great deficiency of education among the body of persons in Scotland assuming the name of chemists and druggists?—Yes.

Have you had means of ascertaining that, from occasionally calling at the shops of different persons and communicating with them?—Yes; from my intercourse with them generally, I think I have been able to form some definite opinion upon the subject.

Do you think that a considerable desire exists among them to obtain some improvement?—Of that I am quite certain; as regards the chemists and druggists in Edinburgh, at all events.

Then do you think the blame rests on the chemists and druggists, or on the laws, which have allowed these abuses to prevail without any interference?—I should say rather from the absence of law; want of regulation.

Has there hitherto been recognised any specific kind of education which chemists and druggists ought to pass through?—No; there is no law on the subject.

You know many chemists and druggists, or a certain number, who are highly qualified, I presume?—Certainly; as regards the dispensing of medicine.

And as manufacturing chemists?—Some of them as manufacturing chemists too.

Do you agree as to the propriety and public advantage of passing a Bill of this description?—I do; I think there is a great call for it.

Do you consider that it establishes a monopoly in the extreme sense of the word?—I certainly cannot see that it establishes a monopoly at all.

You heard it stated yesterday that the Bill was considered by two corporate bodies to be injurious to their interests?—Yes.

Do you think that those objections were well founded?—I cannot answer for the Faculty of Physicians and Surgeons of Glasgow. I do not believe, so far as I can learn, that it does interfere with them; and my opinion is that it does not interfere injuriously with the privileges of the body to which I belong, the College of Surgeons. I differ entirely from my friends who were examined before the Committee yesterday upon that subject.

Has any discussion taken place in that body on the subject of the Bill?—There was a discussion in the college on the subject.

I do not ask for any information which is confidential, but if you feel justified in stating what passed will you tell us whether you argued in favour of the Bill?—I did.

Sir *W. G. Craig.*] Did you receive much support?—No, not a great deal of support; I was beaten by a large majority; I divided the college on the subject.

* At a subsequent meeting of the Committee, the Chairman read an extract of a letter from Dr. Maclagan, which was ordered by the Committee to be inserted on the minutes, stating that, on examining the minutes of the Royal College after his return to Edinburgh, he (Dr. Maclagan) found that on the 25th of February, 1834, the report of a committee containing the above resolutions was received, and while there was much discussion about the other clauses, the whole clauses relating to chemists and druggists were adopted nem. con.

Can you state how many members agreed with you in opinion?—It was a small meeting of the college; there were fifteen who voted against my proposition to petition in favour of the Bill, and five who voted for it.

Chairman.] Were the grounds of objection similar to those we heard yesterday?—I think, so far as I remember the argument, that it was very much the same as that which was addressed to the Committee.

You heard of several proposed amendments in the Bill which had been assented to; would those amendments, in your opinion, meet the objections of the parties who were present at the discussion?—I think some of them.

I allude first of all to proxy voting?—That was part of the discussion in the College of Surgeons; it was one of the objections taken, I think.

With respect to the appointment of the Board of Examiners, do you consider that the board ought to be appointed by the body which is incorporated under Royal Charter, confining it to pharmaceutical chemists, or do you think that it ought to be appointed by a distinct body which has nothing to do with pharmaceutical chemists?—I think it is of great consequence that, however they are appointed, there should be nothing to mix up the pharmaceutical chemists as a corporation with the medical corporations, and therefore that they should be kept as much distinct as possible.

Under separate jurisdictions?—Under separate jurisdictions.

Do you think that some confusion and inconvenience arises from the mixture of the two functions now in practice?—To a certain extent; the public are very apt to suppose that a person who has a druggist's shop is a doctor; it is a very common thing to call a druggist "doctor" when he is not so.

Do you think that that impression is rather increased by the fact, that some medical practitioners keep shops which look exactly like chemists' shops?—I presume that that is the origin of it; they do not know the distinction between the one and the other.

And a person going one day into a doctor's shop, and finding a doctor in it, goes to another shop another day which has only a chemist in it?—Yes, and fancies they are both equally doctors; they do not pay attention to the word "surgeon" above the door, which may distinguish one from the other.

But in the event of a medical practitioner calling himself a chemist, would there be any distinction whatever which would enable the public to know whether they were in a doctor's shop or not?—I think if the same name is used by both, and no other indication separates the one from the other, the public will not distinguish betwixt them.

At present the College of Surgeons have the privilege of examining in pharmacy as well as in surgery?—They examine the candidates for the surgical diploma upon pharmacy.

Do some of their licentiates go into business as chemists and druggists?—A considerable number of their licentiates keep shops; and some of the chemists and druggists of Scotland are licentiates of the college, not practising as surgeons, but acting as chemists and druggists.

Then if the privilege of examining in pharmacy, and of licensing persons who could go into business as chemists and druggists, were continued to the college, with the privilege to their licentiates of calling themselves chemists and druggists, could this Bill infringe in any way upon their privileges?—I cannot see that it does infringe upon their privileges at all.

Would not the effect of this Bill be rather to create a demand for education, and possibly to induce some persons to go to the College of Surgeons for examination who otherwise might undergo no examination at all?—I do not see that exactly.

Would they not have the privilege of granting a diploma for persons following the business of a chemist and druggist equally with the Pharmaceutical Society?—Certainly; that is to say, their licentiates would have the privilege they have at this moment.

Consequently a student might either go to the College of Surgeons or to the Pharmaceutical Society to obtain the qualification of acting as a chemist and druggist?—Yes; but I think he would not go to the Society after taking the more expensive education to qualify him for a surgeon.

Is it not possible that if a law is introduced obliging persons to go through some education, some students might say that as they are obliged to be examined, they

will go to the College of Surgeons and obtain the higher qualification?—That is possible.

But at all events it would not diminish the number of their students?—I should not think so.

Mr. *Hindley.*] Do you think there is anything in this Bill which would prevent any of the surgeons from acting as chemists and druggists?—Certainly not.

Sir *W. G. Craig.*] From the tenor of your evidence you are clearly of opinion, that if there is any doubt upon that subject it ought to be cleared away?—I am quite clear about that.

And that the Bill should be made so that the licentiates of the Royal College should be entitled to act as chemists and druggists?—Certainly; I would have an Act of Parliament to be as unambiguous as possible.

And is it your opinion that there is no objection to licentiates acting in that capacity?—Certainly.

What objection do you think there would be to members of these medical bodies being upon the Board of Examiners?—I do not object to that in the least degree; on the contrary, I think there are many reasons for it; but I think there is no reason why the body of pharmaceutical chemists should not have the selection of their own examiners, as I think they are the most likely to know who would be the most appropriate additions to the board; and I think the objection to making us medical corporations interfere with them is, that it is mixing up the two together, and not keeping them so distinct as it is desirable they should be.

But these medical bodies have a great interest in these examinations being properly conducted; and if they, being men of superior acquirements, desire that they should be represented in the board which it is proposed to establish, what is the objection to it?—I have no doubt that the colleges are well qualified, of course, to select fit persons to examine in any particular department; but my objection to the election of the examiners for the Pharmaceutical Board being in the hands of the colleges is, that it is mixing up the two bodies together. The body of pharmaceutical chemists I wish to keep distinct from the medical practitioners altogether; it would be better if the pharmaceutical chemists would apply to the colleges for the services of their fellows, or to persons distinguished in science, not members of the colleges.

What objection is there to mixing up these two bodies, to the extent of conjoining the examination?—I think that, in the first place, it is important to keep the chemists and druggists distinct from the medical corporations, because by so doing you obviate an objection that has been raised to the incorporation of the chemists and druggists, namely, that you are increasing the number of medical corporations. Now if you keep them distinct, you do not interfere with the corporations of practitioners; you do not mix them up with the bodies of practitioners; and therefore with relation to any question of medical reform, for instance, it does not interfere with that, if chemists and druggists are kept distinct from medical practitioners.

What is your opinion with regard to the general object of this Bill, in preventing the sale of compound drugs or preparations of drugs by any persons as chemists and druggists except licentiates of this society?—I apprehend that the effect of this Bill will be that there will be three sources from which drugs will be supplied to the public. There would be the practitioners of medicine, those holding diplomas, who would be permitted to exercise the function of pharmaceutical chemists as they do at this present moment; then there would be the parties recognised and licensed under this Bill; and then there would be those who did not profess to be pharmaceutical chemists at all, but who merely sold some drugs while following some other occupation; grocers, for example.

But you are certainly of opinion that there should be a prohibition that no person hereafter, exclusive of medical men, should act as a chemist and druggist who had not been licensed by this society?—No, it does not amount to that; I only say he shall not proclaim himself to be a chemist and druggist; he may act perfectly well; there is nothing to prevent any man from acting, but he shall not say he is a chemist and druggist, or lead people to suppose that he is so.

Chairman.] Do you think it would be sufficient that unqualified persons should be merely restricted from using one particular term, such as "pharmaceutical chemist," for example?—I was much inclined to hold that opinion before, and in our private

discussions in Edinburgh I was much disposed to think that that part of the Bill which refers to "signs, tokens, and emblems" should be omitted; but I confess that I am now rather inclined to leave it in, because I think the law would be easily evaded if it were left out.

Do you not think the law would be inoperative, or nearly so, if the only restriction referred to one particular term, and that the same impression might be conveyed to the public by any other means that a person might choose to adopt?—It was that consideration which led me to alter my opinion.

Do you think it makes any difference with regard to a deception being practised whether it is done by words or signs?—No.

Sir *W. G. Craig.*] You do not object to a man acting as a chemist and druggist, provided he does not put this name over the door, and put a pestle and mortar in front of it?—I say that I would have a penalty inflicted on a man who assumed the name, if not entitled to do so, but I would not prosecute him for the practice of the business; the general feeling in Scotland is against penal clauses.

How could a man be committing a fraud if, when you allow him to sell medicines, he merely puts a pestle and mortar in front of his door to indicate that he does sell them?—If that is to be the recognised sign that is to distinguish an authorised pharmaceutical chemist, if you say a man who has no external symbol on his shop is to be understood as a man who has no license, then the public will know the difference between the man who is and is not licensed.

You go merely to the prohibition of the symbol, allowing a man to carry on the trade?—Yes; we object generally to the prosecution of unqualified persons for practising; they do not generally answer the purpose in the end; they often make martyrs of the people; but when you have the distinct fraud of assuming a false title, you have a good ground to go on; and that is not a new principle.

Chairman.] Did not Sir James Graham entertain that principle?—I think that that principle was agreed on in some of the numerous conferences with reference to one of the medical reform bills.

Would this description of prohibition prevent a person keeping a shop for general business, from issuing a circular with a list of what he sold, including drugs, if he did not call himself a chemist and druggist?—No, I suppose not; any one of these general dealers might display in his window a placard stating that he sold rhubarb, jalap, and senna, if he thought fit, provided he put no emblem in his window to make the people suppose he sold those articles as a qualified chemist.

Sir *W. G. Craig.*] Suppose a man filled his window with the usual laboratory bottles, would that come under your prohibition?—That is a difficult question to answer; that is rather for a lawyer to answer than for me. I should consider him as not acting an honest part if he did so.

Then at the same time that you allow him to carry on the trade, you would prevent him from letting anybody see that he does it?—I am supposing this Act in force; he then carries on the trade simply on the understanding that he is ready to dispense medicines. "But (he says) if you come to me to get them, you must understand I am not a person who has undergone an examination; that man over there, who has the emblems, has undergone an examination, but I have not."

Chairman.] Would not that let the public understand that if they want any poisons or strong medicines, they must go to a man exhibiting emblems; but if they want merely an ounce of salts or senna they may take the risk of getting it of a person not educated as a pharmaceutist?—It would simply amount to this, that you would find a qualified chemist in one place and not in another.

Sir *W. G. Craig.*] You would not prohibit a man from making up prescriptions to any extent when they were sent to him by a regular professional man?—I am not disposed to prosecute him for doing so; but if the world goes to him, they go to him with their eyes open; they go with their eyes open into the place of a man who is not qualified.

From the evidence we have had, it would appear that that is not the object of this society: the object of this society is, that no prescription shall be made up except by a person duly examined and licensed?—No, that is not the effect of this Bill. The object of the Pharmaceutical Society, undoubtedly, is to raise up a body of men who shall be capable, well examined, and well educated, and who shall be ready to supply the public with good drugs. That is the object of the Bill; and when the public once knows the difference between the well-educated and non-educated man, then

they will undoubtedly desert the non-educated man, and it will come in effect to this, that the public will be supplied by educated men only.

We have received evidence that the object sought is the absolute prohibition to sell drugs, except they are obtained from one of their own licentiates; do you agree in that?—No; I think that would be a monopoly, and would lead to endless heartburnings.

Chairman.] You are aware that that is the nature of the prohibition of the Apothecaries' Act of 1815?—It is, as regards practitioners, and it has produced that effect.

Do you think that that Act has been much less operative than it would have been if the Apothecaries' Act had merely restricted the prohibition to the assumption of the title of apothecary or medical practitioner?—I should require to go over the Apothecaries' Act more carefully, before I would say that generally. I think one reason why the Apothecaries' Act, and similar penal enactments and prosecutions for acting by unqualified persons, have led to so much heartburning, has been, that it very generally has arisen from the jealousy of one party in a neighbourhood trying to put down a successful practitioner near him.

Have you ever heard of a case in which a prosecution has originated with the Apothecaries Company, from any other cause than that?—I know that plenty of prosecutions have arisen, but I cannot speak precisely to their causes.

Sir *W. G. Craig.*] Have not various obstructions been thrown in the way of Scotch practitioners by the Apothecaries Society?—Decidedly. We have been for a long time striving to get an equality of privilege for persons equally well educated all over the country.

Chairman.] Do you think it is easy to establish an equality of privilege, if among the different Boards of Examiners each board adopts such regulations as they may think fit?—I think they should be as nearly as possible assimilated in right of practice and in the qualification required; and that the education and tone of examination should be as uniform as possible throughout the country.

In the Boards of Examiners proposed for the Pharmaceutical Society, and which are, in fact, in operation, are you aware that the president and vice-president of the society are *ex-officio* members of the two boards for the express purpose of insuring uniformity?—Yes.

Do you think that is a good regulation?—Yes, I think it is.

Do you consider that inconvenience has arisen from the difference in the qualifications of persons in the profession possessing the same title, but having obtained their qualification at different institutions?—You mean, for example, there is a difference in qualification between an M.D. from one university and an M.D. from the other?

Yes?—Yes; there is a difference in the estimation of the value of the degree.

You think the public find out the difference?—Yes; we find a large proportion of the graduates of one university in better practice than the graduates of another.

Sir *W. G. Craig.*] Would not the same difference of qualification exist in persons examined at the same school?—Yes, of necessity there would be a difference of qualification, according to the talent of the individual, where there are a great number of licentiates.

Chairman.] Do you consider it desirable, as far as it can be accomplished, to obtain uniformity of qualification in persons of the same class?—Certainly; all equally good, not equally bad.

In that case any persons desiring a superior qualification to the ordinary one would make extra exertions of their own; it would be a voluntary act on their part; if they wished to take a superior degree beyond what the law requires, it would be a voluntary act?—Yes; for example, a person taking the honorary title of doctor of medicine, when he does not require it, that is a voluntary act.

Would you consider that the degree of qualification established by the Pharmaceutical Society ought to be the minimum qualification that any person ought to have who called himself a pharmaceutical chemist?—I should like to see the curriculum of education that is laid down before I answer that question precisely.

Do you think that the curriculum should be such as to ensure a proper qualification for each individual?—Certainly; there should be a minimum of qualification below which no man should be entitled.

In your lectures on materia medica, do you not enter a good deal into therapeutics?—A good deal.

Would not that be unsuited to the chemists and druggists?—Not unsuited, but unnecessary.

Could you so regulate your course of lectures as to divide them into two portions, one of which should be adapted to chemists and the other to medical men?—It would be perfectly easy, and I have been asked to do so.

Do you think that in case this Bill should pass, the demand for education among chemists would cause such an alteration to take place?—It would not be an alteration in the whole sense of the word. I beg to mention that on no consideration will I ever admit any one to my lectures to take the course of lectures in the ordinary way at a lower fee than the regular fee that is charged in our school; I never will do that on any account; but this much could be very easily done; the first part of my course is on dietetics and regimen; the second part on general therapeutics, both strictly for the education of medical practitioners, and a very important part for them; then, after that, there is the department which we technically call Pharmacology, or a knowledge of the substances employed in medicine, and that is the part of the course which the licentiates of the Pharmaceutical Society would require to attend. They might easily enter as pharmaceutical students; they would attend along with the medical students, but their tickets would not qualify them for the license of the College of Surgeons.

They would only attend a portion of your lectures?—They could in that way.

In that case do you think the institutions of Edinburgh would afford facilities for the proper education of pharmaceutical chemists?—I know they would.

And do you think that the necessity of passing an examination to obtain the rank of a pharmaceutical chemist would induce the apprentices of chemists to come forward?—Undoubtedly; but they ought to be obliged to do it, I think. I may mention that at this present moment a considerable number of apprentices of pharmaceutical chemists in Edinburgh attend the lectures.

Has that been since there has been a movement with a view to the improvement of the qualification?—I cannot answer that question, because the movement commenced a couple of years after I began to lecture, so that I cannot judge. There is another point which I beg to remark with regard to such pupils, that although they are apprentices to pharmaceutical chemists, I have reason to believe that some of them have become medical practitioners eventually.

There is no clause in the regulations of the College of Surgeons requiring an apprenticeship with a medical practitioner, I believe?—No, that is done away with; but our licentiates are required to serve a certain time in a laboratory to form an acquaintance with drugs.

Then they are obliged to obtain a practical portion of their education in pharmacy from a chemist and druggist?—Or in the laboratory of an hospital or dispensary; a course which is most frequently adopted.

I think you informed us that the regulations of the Society of Apothecaries prohibited the licentiates of the College of Surgeons who are examined in pharmacy from practising as apothecaries in England; do you think it would be consistent with the title of this Bill to remove that regulation, or to interfere at all with the privileges of the licentiates?—So far as I am entitled to give an opinion upon the heading of an Act of Parliament, I should say this Bill has nothing to do with it; it does not refer to general practitioners at all.

Do you think that all that can be required from the promoters of this Bill in reference to the medical bodies is to exclude them altogether and absolutely from its operation?—Yes, and to keep them distinct from the chemists, and in doing so, to take care you deprive them of no privilege they have at present.

So that any privilege they enjoy now they would enjoy after this Bill passed?—Yes.

If that be enacted in this Bill so as to admit of no mistake, do you think any medical or surgical body could have any cause to complain of it?—I certainly do not think so.

Do you think the medical profession is interested in the introduction of any regulation which shall insure the more efficient performance of the duty of dispensing prescriptions?—If they are not, they ought to be.

Is not the character of a medical man often at stake with reference to the manner in which his prescriptions are dispensed?—It may be; the non-efficacy of a medicine resulting from inferiority will be as likely to be ascribed by the patient to a mistake

on the part of the doctor (except in a case of sheer poisoning) as to the mistake of the chemist.

Then is it your opinion that the chemists ought to be fully competent to examine and test the medicines they sell?—That is one of the points which I wish to urge, and it is one on which I think the pharmaceutical chemists are deficient; they are not, from their education, properly qualified in that respect.

Are there instructions contained in the pharmacopœia for testing the various drugs for the purpose of ascertaining their purity?—In the pharmacopœias of London and Edinburgh there are.

And do you think that chemists at present, as a body, are competent to apply those tests?—As a body I do not think they are.

Do you think that they will become so by means of the proposed improvement? I think that no one should be allowed to have his license as a pharmaceutical chemist unless he is able to do so.

Are there cases in which the absence of this knowledge is likely to produce serious mischief and danger to the public?—In so far as that they lose a great means of determining the impurity of the drugs which they purchase from the wholesale dealers.

Have you met with instances in which parties have been unacquainted with even the physical character of drugs?—I have indeed; in the case of a druggist having a pretty large establishment, and in a tolerably large-sized town.

Have any circumstances occurred to you in which that has been proved?—I proved it in this instance myself, by the man showing me a sample of a drug which he said was impure, and which he described as being of a bad quality.

What drug was that?—Scammony, a common purgative medicine; and I made him understand that that was the first sample of pure scammony he had ever seen.

Do you believe that other instances of that kind might be found in various parts of the country?—I have very little doubt of it.

Is there any other observation which you desire to make to the Committee?—Yes; I am anxious to point out what is partially alluded to in the paragraph I have quoted; that is, the great lack of progress in pharmacy in this country. That is one of the objects which attracts my attention particularly; that nothing has emanated in the way of pharmaceutical discovery from Great Britain at all, whereas we have received some of the most important improvements in our materia medica, and in our means of practising our profession, from continental pharmaceutists. I need only quote the two examples of morphia and quinine, substances, both of which were discovered, the one by a German, and the other by a French pharmaceutist. Strychnine is another.

Sir *W. G. Craig.*] Who was the discoverer of chloroform?—It was discovered simultaneously by M. Soubeiran, a pharmaceutical chemist, in France, and by Baron Liebig in Germany. You will hardly find an important pharmaceutical discovery in which a continental pharmacien has not had a hand either in establishing it, or as being the original discoverer. One made recently in Edinburgh, by a pharmaceutical chemist there of the active principle of aloes, is almost the only thing of interest I can remember at present as emanating from British pharmacy.

Chairman.] Do you attribute that circumstance to the total absence of any regulations for pharmaceutical chemists?—Seeing that there are no such regulations here as there are on the Continent, and seeing that on the Continent these results are produced, I think the conclusion is obvious.

OBITUARY.

On Thursday, the 22nd of July, RICHARD HOTHAM PIGEON, only son of the late much-respected Treasurer of the Pharmaceutical Society and of Christ's Hospital.

Mr. Pigeon, on the decease of his father, succeeded to the business in Throgmorton Street, in which he had previously had an interest in conjunction with Mr. Burgoyne, the now surviving partner. He was also unanimously elected Treasurer to the Pharmaceutical Society, which office his father had filled from the date of its establishment. Mr. Pigeon died in his thirty-third year, after a short illness.

M. JEAN-JOSEPH WELTER, the inventor of the safety tube which bears his name, and of other useful chemical apparatus, died at Paris, July 8th, aged eighty-nine years. He was the friend of Gay Lussac, and his fellow-labourer in various chemical researches. M. Welter was a Corresponding Member of the Section of Chemistry in the Academy of Sciences, Institute of France.

On Friday, the 2nd of July, Dr. THOMAS THOMSON, Regius Professor of Chemistry in the University of Glasgow, and one of the oldest and most respected of the Chemists of this country, expired at the advanced age of seventy-nine.

Dr. Thomson was the seventh child and youngest son of John Thomson, of Crieff, at the parish school of which place he received his early education. In his twelfth year he was placed for two years in the borough school of Stirling, from whence he went to the University of St. Andrew's, and thus acquired a thorough classical education, the benefits of which were signally manifested in his after-life. It was not until his twenty-third year that an attendance at the lectures of the celebrated Dr. Black awakened that taste for the cultivation of chemical science which determined his future career. About five years afterwards he commenced lecturing on Chemistry, and as he did not relinquish his lectures until the year 1846, he appears to have been before the public as a lecturer for forty-six years.

The first outline of his system of Chemistry appeared in the *Supplement to the Encyclopædia Britannica*, of which he was editor between the years 1796 and 1800. The first edition of his system as a separate work was published in 1802. He is reputed to have been the originator of the use of symbols for expressing the composition of chemical substances, and was one of the first advocates of Dalton's atomic theory, to the establishment of which he contributed by the results of his investigations.

He continued to lecture in Edinburgh until the year 1811, and had a laboratory for the instruction of pupils.

In 1813 he came to London, and started the *Annals of Philosophy*, a periodical which he continued to conduct until 1822, when he resigned the editorship to his friend the late Richard Phillips. In 1827 that work was merged in the *Philosophical Magazine*.

In 1817 he was appointed lecturer on Chemistry in the University of Glasgow, and in the following year, at the instance of the late Duke of Montrose, Chancellor of the University, the appointment was made a professorship with a salary, under the patronage of the crown. It was here that he commenced his researches into the atomic constitution of chemical bodies, which were subsequently published in his *Attempt to Establish the first Principles of Chemistry by Experiment*. Among his published works may be mentioned a *History of the Royal Society*, *History of Chemistry*, and *Outlines of Mineralogy and Geology*.

Dr. Thomson was married in 1816 to Miss Agnes Colquhoun, daughter of Mr. Colquhoun, distiller, of Stirling, and he has left a son, Dr. Thomas Thomson, of the Bengal army, the author of *Travels in Tibet*, about to appear, and a daughter, married to her cousin Dr. R. D. Thomson, who for several years past has performed the duties of his uncle's appointment.

BOOKS RECEIVED.

The Half-Yearly Abstract of the Medical Sciences. Edited by W. H. Ranking, M.D., Cantab. Vol. xv. January—June, 1852. London: John Churchill, Princes Street, Soho. 8vo, pp. 384.

The Prescriber's Complete Handbook, comprising the Principles of the Art of Prescribing. *A Materia Medica, containing all the principal Medicines employed, classified according to their Natural Families, with their Properties, Preparations, and Uses, and a concise Sketch of Toxicology.* By M. Trousseau, Professor of the Faculty of Medicine, Paris, and M. Reveil. Edited, with Notes, by J. Birkbeck Nevins, M.D. London: Hippolyte Baillière, Regent Street, and 290, Broadway, New York, U.S. 8vo, pp. 499. 1852.

Experimental Researches in Electricity. Twenty-ninth Series. By Michael Faraday, Esq., D.C.L., F.R.S., &c. &c. Read before the Royal Society, 1851-2.

On the Physical Character of the Lines of Magnetic Force. By Michael Faraday, Esq., D.C.L., F.R.S., &c.

TO CORRESPONDENTS.

In Answer to several Correspondents, we state in general terms, that all Apprentices must undergo an examination if they intend to become Members of the Pharmaceutical Society; but the Pharmacy Act does not prevent their commencing business as Chemists and Druggists without becoming connected with the Society. Those who desire to be registered under the Act, or who wish for information as to the course they should take for that purpose, should write to the Secretary, giving their names and addresses.

Z. (Settle).—This question is answered in the Notice to Correspondents of our last No.

U. M., A. P. S., wishes to know if the following formula can be dispensed as a perfect emulsion—

℞ Ol. Amygdal. dulc.
Liquor. Ammoniæ, āā ℥j.
Spir. Rosmarini
Aquæ Mellis, āā ℥iij. Misc. fiat Lotio.

The emulsion is sufficiently united for practical purposes, but should be shaken when used. The oil and solution of ammonia should be mixed before the spirit is added.

J. E. (Tottenham Court Road).—The rumour that a recent alteration in the law enables Chemists to sell spirit of wine is a fallacy. It would be dangerous to act upon the supposition that such rumour is founded on fact. Chemists are allowed, not by law, but by sufferance, to furnish spirit for *medicinal purposes only*. See vol. vi., page 99 to 118.

B. W. R.—*Vermilion* was formerly called *cinnabar of antimony*, because it was obtained in the process for making butter of antimony.

A Member (Wolverhampton).—The substance sold as *jalapine* is resin of jalap, which has been precipitated from an alcoholic solution by the addition of water. There are two or three methods of preparing it, which yield products not quite identical. Thus, the jalap in its usual state may be exhausted with spirit, some of the spirit removed by distillation, and the residue mixed with water. In this case the jalapine would retain much colouring matter. Again, the jalap may be first boiled with water, so as to remove everything soluble in that menstruum, then treated with spirit so as to extract the resin, and this solution may be digested with animal charcoal to remove colouring matter, afterward concentrated and mixed with water. In this case it would be almost colourless.

An Old Member (Dudley).—(1.) Wishes to know how a certain essence, used for flavouring culinary matters, is made, but as no sample has been sent we are unable to give an opinion.—(2.) Treat the dregs in the manner usually adopted for obtaining morphia from opium.—(3.) *Syrup of poppies of the French Codex.* Take of alcoholic extract of poppies one part, distilled water eight parts, simple syrup 100 parts. Dissolve the extract in the water, filter the solution, add it to the syrup, boiling, and strain.

C. L. M. states, that on opening a parcel of milk of sulphur, he found that the greater part of it had changed its colour, and he wishes to be informed the cause of this change. An opinion founded on such slight data would be of little value.

A Member (Birmingham).—We have not been able to find the article referred to.

A Subscriber.—We know of no better way of preserving leeches than that which it appears you adopt.

Mr. F. Rose, of Norwich, states, "I would, through the medium of your Journal, caution my fellow-Druggists to be on their guard against a deputation (as I suppose) from the Commissioners of Stamps, which has been too successful in this city."

R. J. T. (Exeter).—Medicines, to which the labels referred to are attached (excepting castor-oil and aperient mixture), will require to be stamped, as reference is made to the complaints for which they are recommended.

W. G. H. (Reading).—Ammoniacal solution of nitrate of cobalt may be used.

An Enquirer.—(1.) The examinations are not confined to any particular books.—(2.) Indentures are not required.—(3.) Application must be made to the Secretary.

Meetings have been held in Liverpool, Manchester, Newcastle, and, we believe, at some other places in the country, for the purpose of discussing the provisions of the Pharmacy Act, but as these were occurring just at the time of our going to press, we are unable to insert any particulars in the present number.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor.

THE PHARMACEUTICAL JOURNAL.

VOL. XII.—No. III.—SEPTEMBER 1st, 1852.

A BIRD'S-EYE VIEW OF THE CHEMISTS AND DRUGGISTS OF GREAT BRITAIN.

Our extensive correspondence and personal communication with the Members of the Pharmaceutical body during several years, have made us acquainted with their position, requirements, habits, and general sentiments. So far as these bear upon their future prospects, a few remarks may not be out of place.

The most striking characteristic of the Chemists and Druggists prior to the formation of the Pharmaceutical Society, was the total absence of chemical affinity for each other. Nothing but actual persecution or bodily fear could bring them together. The cause being removed, the effect ceased—and until the recurrence of a similar source of attraction in the shape of a new peril, the repulsive force prevailed. No other communications of an official character ever took place between them, and in the meetings which were held, the science of the Chemist was overlooked and forgotten in the defensive struggles of the tradesman. Even between individuals there was an unaccountable reserve in reference to chemical subjects and Pharmaceutical qualification. It appeared to be forgotten that knowledge—like money—produces interest by circulation, and that knowledge is the true source of power, position, and respectability.

When the permanent union of the Chemists for mutual improvement and advantage was proposed, the chief obstacle to be overcome was the incompatibility of the elements to be united; and the senior members of the trade, judging from past experience, considered the project chimerical. Upon a further discussion of the proposal, it was discovered that the shyness and reserve which had hitherto prevailed, was rather habitual and superficial than constitutional, and when the ice was broken the current began to flow in the right direction, and a disposition to go with the stream was manifested. Jealousy and distrust gradually gave place to more worthy sentiments, and although some of the old leaven still remains to be rooted out, the absence of chemical affinity for each other is no longer the characteristic feature of the Chemists and Druggists.

When the detailed plan of the Society was suggested and discussed, it was received in a manner symptomatic of the disjointed and unorganised condition of those to whom it was addressed. It met with an immediate response from some whose own experience had led them to similar conclusions, who were sensible of the evils, and rejoiced to see that others concurred with them in desiring to provide a remedy. Some granted the hypothesis, but denied the practicability of the deduction. They said nothing could be done without an Act of Parliament, which it would be impossible to obtain, and, suiting the action to the word, they withheld their co-operation. A considerable number, however, although only partially convinced, followed the example of those in whose judgment they had confidence, and lent a helping hand. Others again shut their eyes against facts and their ears against arguments, denied the existence of abuses on one side or danger on the other, and composed their minds in an artificial security, as the ostrich buries his head in the sand and thinks himself safe because he can see nothing. Lastly, there were the systematic opponents of change, who think it "better to bear the ills we have than fly to others that we know not of;" and the advocates of peculiar crotchets, who view every subject through their own telescope.

Such were the auspices under which the Pharmaceutical Society was introduced. It may be supposed, therefore, that it was no easy matter to smooth

down asperities, and adapt its constitution and regulations to the sentiments and circumstances of the parties concerned. Some advocated a high subscription to ensure respectability, others a moderate one to avoid exclusiveness; some thought the examination should be compulsory on all Members from the commencement; others desired that not only the original Members, but Associates and Apprentices should be exempted. On other questions conflicting opinions arose, and it was not easy to adjust the balance. These difficulties were gradually overcome, in consequence of the disposition which prevailed among the majority to wave minor prejudices for the sake of attaining the great object—unanimity; and although it was impossible to please all, an amicable arrangement was effected by mutual concessions, and the constitution of the Society settled down to its present state.

Similar influences prevail to a greater or less extent in the provinces and in the metropolis. In most towns, some of the most intelligent and respected inhabitants are Chemists. We continually find them filling responsible offices, such as mayor, magistrate, guardian of the poor, &c., and also connected with sanitary committees and local institutions of a scientific and useful description. They are not usually addicted to politics, but it will be generally found in any town where a Chemist enters into such matters, he holds a prominent position in the committee of his party. We have observed rather a tendency to conservative principles on general subjects, and also in reference to sweeping reforms and changes in their own business or profession. The services of Chemists on juries are held in estimation; they are considered—as a class—superior in intelligence and experience to the average of tradesmen, and this is urged as the principal argument against their exemption from serving on juries. The Chemist and Druggist, although not a professional man, is usually recognized as a link between the trade and the profession. His avocations, if faithfully and conscientiously performed, demand the exercise of the mental faculties, and the knowledge thus acquired lays the foundation of the influence and respect which he enjoys. This is the case with the *bonâ fide* Chemist and Druggist who has voluntarily taken the means to establish a fair reputation in his business. While, however, the merits and character of some individuals reflect credit on the class, this is in some degree neutralized by the delinquencies of others, and the mixture of the business of the Chemist and Druggist with other trades is carried to such an extent in many places, that it is quite impossible to draw the line with a view to classification.

In one town with which we have communicated, a majority of the Chemists and Druggists are ladies, an occurrence not unfrequent in other places.

In most towns there are some whose business consists chiefly in counter-practice, who are engaged from morning till night in prescribing for the poor at twopence or threepence per dose. These are the parties who bring down upon the entire body the indignation of the Apothecaries, and are pointed out as illustrations of the encroachments of the Chemists and Druggists. It is, however, admitted on all hands that those who carry on and encourage this kind of business occupy an inferior position in the trade, and that in proportion as they rise as Chemists, they avoid, instead of courting, the responsibility of irregular medical practice.

Since the establishment of the Pharmaceutical Society a considerable improvement is observable in the general character of the business, for although Chemists and Druggists cannot be driven they may be led, and a Society of this description, established on a sound basis and inculcating certain principles, exerts an influence which spreads by imperceptible degrees, and the result is manifested by the increased desire for information, the adoption of improvements in the mode of conducting business, the encouragement of education in the junior members of the trade, and the desire to assist in the measures requisite for raising the status and qualifications of its members. These effects are most observable in places where a sociable and friendly disposition prevails among the Chemists, and more especially where endeavours have been used to obtain an honourable

understanding with the members of the medical profession, who have, in some instances, given their cordial assistance by delivering lectures, attending scientific meetings, and reading papers. Where the Chemists will not be induced to come together or to observe what is passing around them, no progress can be expected. They adhere to the habits of their forefathers, adopt the ostrich as their model, shut their eyes and ears against evidence, and believe themselves to be secure. In a few years they will wake from their sleep, and on taking a bird's eye view of the Pharmaceutical Chemists of Great Britain, they will find themselves, like Rip Van Winkle, a generation behind their brethren.

WHAT LOOMS IN THE DISTANCE.

In the foregoing article we referred to the favourable estimation in which the *bonâ fide* Chemist and Druggist is held by the public on account of the mental training which the acquirement of the necessary qualification for his business demands, and the influence resulting from such education. This, however, being altogether voluntary, belongs rather to a section of the class than to the class itself; that is to say, a man who has acquired a reputation as a respectable Chemist and Druggist is presumed to be an educated man, but the fact that he is, or calls himself a Chemist and Druggist, does not confer upon him influence or respectability. When the Pharmaceutical Chemists are as a class separated from those who possess no qualification, the case will be different. Admission into the class will be *de facto* presumptive evidence of education and mental superiority. The demand for ordinary commodities regulates the supply. As long as the distinction between a genuine and a spurious article is not known, both fetch the same price in the market; but when the distinction is pointed out, the demand for that which is genuine increases. The same result will follow when the distinction between a Pharmaceutical Chemist and a "blue-bottle Chemist" is understood by the public.

A review of the past often affords data for calculation as to the future. We have seen that many Chemists and Druggists withheld their support from the Society until a Charter was obtained; some still refused to come forward, because they said nothing could be done without an Act of Parliament. An Act having been obtained, it has been questioned whether the powers conferred by the Act are sufficient for the purpose. When excuses are wanted they are easily found. But if those who raise these doubts and fears as an excuse for their own inactivity, had put their shoulders to the wheel in the first instance, they would have greatly facilitated and expedited the result which has now been attained without their assistance.

Thus far, discouragements and obstacles have been surmounted, but much remains to be done. We must not expect to sail with a fair wind in smooth water without intermission. We shall from time to time have fresh difficulties, which, as heretofore, will be overcome by the same steady perseverance which in past experience has been found successful.

A question has arisen on the interpretation of the provisions of the Act and the Charter, relating to the admission of Chemists who commenced business on their own account after the date of the Charter, and before the passing of the Act. The Charter confers the power of admission by certificate of due qualification. The bye-laws define the mode in which this power is to be exercised. The Act confirms the Charter, and also confirms the bye-laws until the next Annual Meeting in May. It has been thought advisable to obtain a legal opinion on the subject, as it is the desire of the Council to admit all Chemists and Druggists who were in business on their own account prior to the passing of the Act, on production of satisfactory evidence that the parties so admitted are duly qualified, but without obliging them to come to London to pass the regular

examination. The importance of effecting this object has been pointed out in other parts of this number.

While we regret that any doubt has arisen on this point, we are not at all apprehensive as to the ultimate result. Several modes of overcoming the difficulty have been suggested, but the legal opinion not having been received, it would be premature to enter further into detail. It is not improbable that other questions may arise, requiring serious consideration, in the course of the proceedings under the Act, and endeavours may be used by interested persons, who, like the stormy petrel, are always in their element in foul weather, to raise doubts and distrust, and to magnify any difficulties which may occur. Whatever statements may be made for the purpose of throwing dust in the eyes of the Members, we see nothing in the distance but a triumph over all obstacles, and the attainment of the objects contemplated in the Act. This we have kept steadily in view from the commencement.

Nothing of importance has been added to or taken from the facts originally published and discussed. The necessity for the movement was proved in the first instance, every year has furnished fresh evidence, and the facts are recorded in the report of the Select Committee of the House of Commons. The principal difficulties have been overcome, we have taken several steps in advance, and nothing remains but to persevere and take a victory.

THE ADULTERATION OF COFFEE, &c.

Towards the close of last session, the retailers of coffee were alarmed by the circulation of a rumour respecting the rescinding of the "Treasury Minute," which permitted the mixture of chicory with coffee. The Chancellor of the Exchequer in reply to a question in the House, said that the minute was not rescinded, and that all he could say was, that whatever regulations might be made on the subject, would be such as to do no injury to the fair trader.

The Chancellor of the Exchequer has kept faith with the fair trader, and placed a check upon fraud by substituting for the former license to adulterate, the following minute:—

"That in future, licensed dealers in coffee be allowed to keep and sell chicory, or other vegetable substances, prepared to resemble coffee, in packages sealed or otherwise secured, containing respectively not less than two ounces, and having pasted thereon a printed label, with the name or firm of the seller, the exact weight and true description of the article contained therein, and provided that no such article be kept in a loose state, or otherwise than in such packages aforesaid, in any room entered for the storeage or sale of coffee."

By this minute, as much liberty is granted as rogues ought to be trusted with, or honest men could desire. Chicory, roasted corn, beans, or other substances may be sold singly or mixed, provided the actual contents of each package are stated on the label. The public will choose for themselves. They may have pure coffee if they please, but if they prefer it sophisticated they must mix it themselves. We are not aware of any objection to the moderate use of chicory, and some persons think it improves the flavour of coffee. But the "Treasury Minute" which allowed the unrestrained mixture, encouraged fraud, by affording to dishonest retailers the opportunity of mixing with their coffee not only chicory, but any trash with which it might suit their purpose to adulterate the compound. A Commission is at this time engaged on behalf of the Government, in the examination of chicory and coffee in reference to this question.

It would be well if some regulation could be adopted with regard to certain drugs which are systematically sophisticated. For example: if scammony, chalk, and flour were sold separately, the public might mix them or not, according to fancy. If milk of sulphur and sulphate of lime were sold in ounce or two

ounce packages, the consumer might mix them in equal proportions, and he would have the compound usually sold as milk of sulphur at about the same price, or he might at discretion swallow either pure sulphur or plaster of Paris. We might instance senna leaves and cynanchum as another example, but this adulteration has been so thoroughly exposed and denounced, that the evil has been greatly diminished by the reduction in the value of the mixed article, and we have lately seen very little cynanchum in the Alexandrian senna; in many samples none at all. The continual exposure of frauds of this description is probably the best means of checking them, for when the trade and the public are undeceived the fraud ceases to be profitable.

THE PATENT MEDICINE LICENCE

becomes due on the first of September. We take this opportunity of cautioning those who may enter into business during the period that a licence is in force. When a business, the proprietor of which has a licence, is disposed of, the licence is not available to the purchaser unless due notice be given at Somerset House. If a partner be admitted into a firm, it is equally necessary to give notice, that his name may be inserted in the licence. A case was lately submitted to us, in which a prosecution was threatened against the purchaser of a business on account of his neglect of the above precaution. He was under the impression that the licence was granted to the business, whereas it is granted to the individual, and is in force only with reference to the address mentioned on the licence.

LUCIFER MATCH MAKING AND AMORPHOUS PHOSPHORUS.

The announcement of Professor Shrötter's discovery of the mode of preparing amorphous phosphorus, derived much of its practical interest from the supposition that the phosphorus in this state would be less dangerous and injurious to the persons engaged in the manufacture of lucifer matches. A medal was awarded to Mr. Albright* for the introduction of the prepared phosphorus as an article of commerce, and it may now be obtained at a moderate price of Messrs. Sturge, of Birmingham. The dreadful disease to which the makers of lucifer matches are liable, from inhaling the fumes of ordinary phosphorus, having been described and brought under public notice,† it might have been supposed that no time would have been lost in ascertaining the value of the above discovery as a means of alleviating so much human suffering. Matches prepared with the amorphous phosphorus were shown in the Great Exhibition, and it was stated at the time, that in the manufacture of these matches the evils arising from the inhalation of deleterious fumes were obviated, while the result of the experiment was satisfactory.

It is, however, difficult to introduce any innovation of this kind into an extensive branch of manufacture. A series of experiments must be made to test the efficacy of the new preparation, the most advantageous mode of employing it, the quality of the goods, and the economy of the process. In the mean time the several departments of the manufactory are progressing like clock-work. All hands are busily employed, the proprietor is fully occupied with superintending the operations and the accounts, and a large box of amorphous phosphorus remains in the office unpacked, waiting for a convenient opportunity to complete the experiments.

Such was the state of affairs at Mr. Dixon's manufactory at Newton Heath, near Manchester, on the occasion of a recent inspection. Outside the building large

* For the specification of the patent, see vol. xi., p. 369.
† See vol. vii., p. 592.

piles of timber were stored up ready for use. A machine worked by a steam-engine was reducing blocks into the form of matches. A block previously cut the length of the match, and pressed against the side of the machine, disappeared in a few seconds. The sticks being removed into the next room were tied into bundles about eight inches in diameter, ready for dipping in sulphur. This was done in another room in an iron vessel over a furnace. Immediately after the dipping the workman gives each bundle a slight pressure with a rotatory movement, to separate the matches from each other at the moment of solidification, otherwise the sulphur would cohere into a solid mass. The matches are next transferred into a room where they are arranged, so as not to be in contact with each other, in frames about two feet by one foot, ready for the phosphorus dipping. The composition used for this purpose consists of chlorate of potash, phosphorus, and glue, and it is spread in a thin layer on a stone or marble slab, heated below by steam or hot water. The operator holds the frame lengthways, and dips the ends of the matches in the composition, taking care that all of them are coated. Sometimes the sticks are in the first instance cut twice the required length, dipped at both ends, and afterwards bisected. In the process of cutting they occasionally ignite, occasioning loss, and also vitiating the atmosphere. When the dipping is completed, they are taken to the sorting room and packed in boxes. In another room the boxes are labelled and then sent to the packing room. The boxes are made on the premises, the shavings cut and the tops and bottoms stamped by machinery, cut to the proper size, glued, and fitted, which operations are performed in separate apartments. Each box of lucifer matches, price retail one halfpenny, passes through the hands of seventeen persons, chiefly children. The Factory Act is not applicable to these establishments, and the children, averaging from seven to twelve years of age, work twelve and sometimes thirteen hours in the day. They earn (by piece work) from 3*s.* to 5*s.* a week, and the adults from 9*s.* to 12*s.*

The cases of disease occur chiefly in the phosphorus dipping room, sometimes in the room where the matches are sorted and packed in boxes, but seldom in other parts of the establishment. The nature of the disease is described in the *Dublin Quarterly Journal of Medical Science*, for August, page 10, by Mr. Harrison:

"An affection ensues which is so insidious in its nature that it is at first supposed to be common toothache, and a most serious disease of the jaw is produced before the patient is fairly aware of his condition. The disease gradually creeps on until the sufferer becomes a miserable and loathsome object, spending the best period of his life in the wards of a public hospital. * * * * Many patients have died of the disease; many, unable to open their jaws, have lingered with carious and necrosed bones; others have suffered dreadful mutilations from surgical operations, considering themselves happy to escape with the loss of the greater portion of the lower jaw."

Mr. Harrison's paper contains much interesting information, with the medical reports of several cases.

It would be foreign to our purpose to enlarge upon this view of the subject; but the disease being of chemical origin, the *modus operandi* of the poison may involve a chemical inquiry. Does the phosphorus when inhaled destroy the vitality of the bone by chemical action on its substance? or does it operate merely as an irritant on the tissues, causing inflammatory action? The bone in its diseased state has a spongy cellular appearance, with excrescences of a similar character adhering to it. The teeth generally continue sound and white, while the jaw which contains them is altered in texture, dead, and discoloured. We believe the diseased bone has not been chemically examined. Whether such examination would throw any light upon the subject is a speculative question; but we think not unworthy of consideration.

There are at this time in the manufactory several persons who have suffered

severely from the disease, and who on recovery immediately returned to their work—not however to the dipping department. In the museum of the Manchester Infirmary is the lower jaw of a young woman who is now at work. Her face is much disfigured by the loss of her chin, and on looking into her mouth the root of the tongue is seen connected with her under lip, the space formerly occupied by the jaw being obliterated by the contraction of the cheek. A young man who has lost his jaw is also in the factory. These are not isolated cases.

It is stated in the factory that the workpeople have sometimes applied the phosphorus paste to decayed teeth, under the idea that it was a cure for the toothache, and to this imprudence some of the early cases of the disease are attributed. The frightful nature of the disorder is now sufficiently understood to serve as an incentive to greater precautions. Increased attention has been paid to ventilation and cleanliness, and the practice of taking meals on the premises is not allowed. It appears, however, from the statements of some of the workpeople who are engaged in the phosphorus dipping room, that their clothes become incandescent in the dark, and although the cases of the disease are less frequent than they have been formerly, a security against its recurrence is not attained. The proprietor of one factory states that he has had no cases in his establishment on account of a more careful method of dipping the matches, by which the face of the operator is further removed from the source of danger; but we are informed that some patients from that factory have applied for medical relief in the neighbourhood. Mr. Standring informs us that there is now in the Manchester workhouse a young woman suffering from "phosphoric jaw." She worked three years in a match manufactory; she then went to a silk mill, where she had been about a year and a half before the disease first made its appearance. Eleven months since she was admitted into the infirmary and remained there eighteen weeks, since which time she has been an inmate of the workhouse. The disease at present affects only one side of the jaw—a portion of which is likely soon to be detached.

Various means of prevention have been tried, and others suggested. In a manufactory in Dublin, camphor is added to the compositions, which masks the smell, and is said to act as a prophylactic. This latter opinion requires further proof. Mr. Taylor, of Nottingham, suggests the use of a mask with a tube communicating with the outside of the building. Mr. Stanley, of St. Bartholomew's Hospital, recommends the exposure of oil of turpentine in saucers about the workrooms, as a solvent of the fumes of phosphorus. Dr. Baur recommends the use of a sponge or handkerchief moistened with a solution of soda or potash and applied to the mouth. The proprietor of the factory above referred to states that he has diminished the quantity of phosphorus to less than a third of that which he formerly used, and that by this and other precautions the prevalence of the disease has been greatly diminished. He has tried the amorphous phosphorus on a small scale, by way of experiment, and says that it is more expensive than the ordinary kind, as a larger quantity is required. But the chief objection appears to be that the composition now in use answers quite well. The matches never fail; the mode of preparing the composition is understood; the result is known, and the demand for the matches unceasing. The amorphous phosphorus requires further trial; the makers are not yet accustomed to it; they seem to be afraid of it. If it should fail, their trade would be injured; the experiment would interfere with the habits of the factory; therefore the operations are continued in the usual way, the box of Sturge's phosphorus remains unopened in the office, and the value of the discovery is not fairly put to the test.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

SCHOOL OF PHARMACY.

ARRANGEMENTS FOR THE ENSUING SESSION.

At a Meeting of the Council of the Pharmaceutical Society, held on the 18th of August, 1852, the following resolutions were passed:—

That Mr. Smith be appointed Registrar under the Pharmacy Act, 15 and 16 Victoria, cap. 56:

That Dr. Pereira be requested to accept the office of Honorary Professor of Materia Medica to the Pharmaceutical Society:

That Mr. Redwood be appointed Professor of Chemisty and Pharmacy at a salary of £200 for the ensuing session: that he deliver ninety lectures in the session, part of which lectures, if desired by the Council, shall be delivered in the evening. All apparatus and materials for illustration not now in the possession of the Society, to be provided by the Professor: that the Professor shall conduct the practical instruction in the laboratory under the superintendence of the Laboratory Committee: that he shall receive the fees of the students, pay all the expenses of the laboratory, and render an account of receipts and expenditure to the Council at the close of the session:

That Mr. Redwood continue to fill the office of Librarian and Curator of the Museum without receiving any special salary for that office:

That Mr. Bentley be appointed Professor of Botany and Demonstrator of Materia Medica, at a salary of £150 for the ensuing session: that he deliver fifty lectures on Botany and the Natural History of Drugs, a portion of which lectures shall, if desired by the Council, be given in the evening; and that the Professor assist in the arrangement of the specimens in the Museum relating to the above subjects:

That Mr. Greaves be appointed Sub-Librarian and Sub-Curator of the Museum, and Lecture-Assistant, at a salary of £100 for the ensuing session.

Members, Associates, and Registered Apprentices, or Students, shall be admitted free to the lectures. Students in the laboratory, not being registered, shall pay a fee of one guinea to the Society for each course of lectures.

SPECIAL GENERAL MEETING OF THE PHARMACEUTICAL SOCIETY.

At a Special General Meeting of the Members of the Pharmaceutical Society of Great Britain, convened by the Council, and held at the house of the Society, on Wednesday, the 4th day of August, 1852, at eight o'clock in the evening, "To discuss the Provisions of the Pharmacy Act (15 and 16 Victoria, cap. 56), and to consider the steps which it may be expedient to take in reference to it:

MR. JOSEPH GIFFORD, PRESIDENT, IN THE CHAIR.

Mr. Edwards, of Dartford, moved the first resolution; he said there could not be much difference of opinion respecting the resolution which he held in his hand. The Society was established for the purpose of creating a distinction between qualified Pharmaceutical Chemists and those who have no just right to assume that title. The Act recognized this distinction, and thus gave the Chemists the power of attaining the desired object. This could only be done by bringing within the operation of the Act all duly qualified Pharmaceutical Chemists. He therefore moved—

"That in order to bring the Pharmacy Act into more extensive and immediate operation, it is desirable that the Pharmaceutical Society should include among its members all duly qualified Dispensing Chemists throughout the United Kingdom."

Mr. Collins, of Islington, seconded the resolution. He thought, however, that some information should be given to the meeting as to the terms upon which it was proposed to admit new Members.

The Chairman remarked that this subject would be referred to in a subsequent resolution.

Mr. Jacob Bell said he thought the present would be a convenient time for him to give some explanation respecting the Act, as various opinions prevailed on the subject, and he had within a few days heard it said that the Act was of little or no value. He believed this impression arose from a very imperfect acquaintance with its provisions and tendency, and that if brought into general operation by the Chemists, it might effect nearly all that was required. It had hitherto been a source of complaint that no distinction existed between qualified and unqualified persons. The Legislature had now placed it in the power of the Chemists to establish this distinction. In some respects the present Act would be more effectual than the original Bill, as it contained no exemptions. According to the original Bill all unregistered persons were prohibited from assuming any name or title implying qualification to carry on business as a Chemist and Druggist; consequently, is was necessary to exempt medical men, who had passed an examination in Pharmacy, from this restriction. But the Act having been modified so as to be entirely voluntary, and merely conferring a specific title on those who might be disposed to come within its operation, it was not necessary to exempt medical men. They might, as before, carry on business as Chemists and Druggists, but could not assume the title now recognized as designating a qualified Pharmaceutist. The public would, therefore, discover whether the preparation and dispensing of medicines was more efficiently performed by the one class or the other, and regulate their patronage accordingly. It would be the interest of all qualified Chemists to continue their connection with the Society, and of Assistants and Apprentices to join it by passing the examination. With regard to the admission of new Members, the charter and bye-laws specially provided for the cases of those who had been in business before the 18th of February, 1843; but a considerable number of Chemists had commenced business since that date, having previously been Assistants for several years, and being as well qualified as the average of the original Members. The attention of the Council had been directed to these cases with reference to the amount of liberality with which the terms of the Act should be interpreted in regard to the admission of such parties. He had recently attended meetings at Liverpool, Manchester, Newcastle-on-Tyne, and Nottingham, and it appeared to be the unanimous desire of the Chemists in those places that every facility which the law would admit of should be granted to those who might desire to join the Society. This was one of the questions to be considered by that meeting; but the present resolution referred to the general principle—whether it was desirable to adopt the liberal or the restrictive policy. In one case the privileges and distinction would be confined to a limited number, in the other they would be extended to all who could establish a claim to be placed on a par with the present Members. It had always been the desire of the Council to extend the benefits and influence of the Society, and to avoid as much as possible any semblance of monopoly. The Council had been adjourned for a fortnight for the purpose of further considering the question after the sense of that meeting had been obtained, and also for completing the arrangements for the ensuing session.

Mr. Allchin inquired whether it was intended to extend a similar liberality to Assistants of the present time? He thought there were many who had been engaged for years as Assistants who were quite as much entitled to the privilege as those who had recently commenced business on their own account.

Mr. Bell explained that, according to the original Bill, it was necessary for

all those who carried on business as Chemists and Druggists to be registered. It was, therefore, necessary to admit to registration all who had embarked in the business either as Assistants or Apprentices. This exemption, however, did not entitle them to become Members of the Society without examination. *The present Act left them in precisely the same position as the original Bill would have done.* They might carry on business as Chemists and Druggists in the same manner as if the Act had not been passed, but if they desired to enjoy the distinction conferred by the Act upon those connected with the Society, they must comply with the required regulations.

Mr. Philpott inquired on what terms it was proposed to admit new Members, whether any alteration would be made in the subscription, and what certificates would be required? He thought it unfair for new Members to be admitted on payment of a small fee, registered as Pharmaceutical Chemists, and then allowed to retire.

Mr. Waugh observed, that the present discussion appeared to be irrelevant to the resolution before the meeting. The question was, whether a liberal or a contracted view of the Act should be adopted—in other words, it resolved itself into a question of *free-trade* versus *monopoly*. He considered that the liberal policy would strengthen the Society by drawing within its ranks a larger number of supporters. Of course the Council would take every precaution to exclude improper persons.

The resolution was put, and carried unanimously.

Mr. B. B. Orridge moved the second resolution. He said, that the nature of his occupation brought him into communication with Chemists and Druggists in all parts of the country. He found that many who had not joined the Society regretted very much that they had not done so. No doubt want of faith in the permanence of the Society had influenced a considerable number, who now found out their mistake. He thought a liberal interpretation of the law respecting the admission of Members would be a popular measure, and that, if exercised with judgment, it would strengthen the Society without lowering its character. He moved—

"That this meeting recommends the Council to adopt a liberal construction of the terms of the Act in regard to the admission of Chemists in business on their own account before the passing of the Act."

Mr. Bartlett (of Chelsea) seconded the resolution. He knew many creditable and qualified Chemists and Druggists, who had been for a long time engaged as Assistants, but who not having been in business on their own account had not become Members of the Society. He thought the admission of the parties to whom he referred on liberal terms would be a mutual advantage to themselves and to the Society.

Mr. Bottle thought that any leniency adopted with regard to the admission of Members should be extended to Assistants and Apprentices of the present time. He knew several who were qualified to manage businesses, and who held responsible situations, but could not avail themselves of the means provided by the Society for preparing for the examination, and having entered the business without anticipating such an ordeal, would hesitate to present themselves without going through the usual preparation.

Dr. Edwards (of Liverpool) observed, that having been present at a meeting of the Council on that day, and also at recent meetings at Liverpool and Manchester, he might explain the view generally taken on the subject. Dispensing Chemists were of two classes, Members and non-Members. Of the Members there were two classes, some admitted without examination on account of their standing in the business, others admitted by the usual examination of the Society. Of the non-Members a considerable number had also been examined, not by the Society but by the public, and occupied a position as creditable as that of the Members generally. If the Society did not recognize those whom the public recognized as trustworthy and qualified, then

much confusion would arise. These would continue in business as Chemists and Druggists, and having no connection with the Society, would not impress upon the minds of their Assistants and Apprentices the necessity of joining it by passing the examination, consequently the young men would be likely to continue in business as mere Chemists and Druggists without aspiring to the title conferred by the Act. This would not be the case if a proper regulation were adopted for the admission of such parties into the Society, and thus gaining the advantage of their influence over the young men in their establishments. It was thought that a certificate signed by six Members of the Society, stating that the candidates were duly qualified, and likely to promote the objects contemplated in the Act, would be a sufficient guarantee of their eligibility. This was in accordance with the terms of the charter, which were recited in the preamble of the Act, namely, that the Members should consist of "Chemists and Druggists who were or had been established on their own account at the date of the said charter, or who should have been examined in such manner as the Council should deem proper, or who should have been certified to be duly qualified for admission," &c., &c. By the adoption of a regulation of this kind, no person would have any right to complain. Those admitted on the recommendation of two Members certifying that they had been in business before the date of the charter, would rest their claim upon the standing and experience acquired by time; the others certified by six Members, would have the additional recommendation that they were desirable persons for admission. The young men admitted by examination could not justly complain, as their certificates of qualification and the knowledge acquired in preparing to pass would be an ample equivalent. They would never have cause to regret it; as in fact they would be in a higher position than those who had escaped this ordeal. The standard of qualification would not be lowered by this means, as the regulation would be of a temporary nature only, the object being to admit qualified persons who were now in business; but after the 1st of May next, no person would be admitted except by examination. With regard to the suggestion of Mr. Allchin and Mr. Bottle, it must be remembered that the proposed extension of the Society was in accordance with the terms of the Charter, which was confirmed by the Act, giving discretionary power to the Council in regard to Members. This did not extend to the admission of Assistants or Apprentices, who could only be admitted by passing the minor and major examinations, the Council had no power to waive these, and he was convinced it would be a mistaken kindness to do so if they could.

Mr. Bottle asked whether there would be any security against persons joining the Society and retiring after having been registered as Pharmaceutical Chemists?

Mr. Bell observed, that this question had arisen, and it had been pointed out as a defect in the Act that the Society had not sufficient power to enforce the continuance of the annual subscriptions. He doubted, however, whether this contingency could have been obviated by any constitutional means, but was not apprehensive as to any practical inconvenience arising from the omission. In the case of new Members admitted by examination it would of course be necessary to require a life-subscription in one payment. With regard to those who had been admitted as original Members, on the ground of their standing in the business at the time of the passing of the Act, their qualification, although not tested by the Board of Examiners, had been implied, and it might be thought inconsistent to deprive them of the rank depending on this implied qualification on account of the non-payment of an annual subscription. There would, however, on other grounds, be an inducement to continue connected with the Society, which he was persuaded would be a sufficient security against any great amount of secession. It must be recollected that the power of regulating the affairs of the Pharmaceutical body in this country was vested in the Society; that the Act gave the elective franchise to every Member; that none but Members could take any

part in the proceedings; and that those who seceded from the Society would place their interests at the mercy of others, over whom they could have no control or influence. The Society being the body legally recognized as representing the Pharmaceutists, would be referred to by the Legislature in any case in which the interests of that class were concerned, and if a majority of the Members should be so ill-advised as to secede, an undue amount of power would be vested in a comparatively small number. The class of Chemists most likely to be steadfast in their support of the Society would be those whose interests would be least affected by the restrictions hitherto threatened in medical Bills and other measures which had created great alarm in the minds of the Chemists in general, especially in remote districts, where they possessed no means of information or defence. Experience had shown the importance of union in case of attack, and the necessity of the representation of the interests of every class of Chemists and Druggists on such occasions. Mr. Bell gave an illustration showing the fallacy of the supposition that registration as a Pharmaceutical Chemist would comprise all the advantages and security resulting from connection with the Society. There would always be a sufficient number of Pharmaceutical Chemists whose intelligence and public spirit would induce them to support such an institution, and the retirement of those whose minds were too contracted to appreciate its objects, tendency, and advantage, would be no loss except to themselves.

Mr. Bland was one of those who had not been fully satisfied with the proposed evidence of qualification which would be afforded by the signatures of six Chemists. In his neigbourhood there was a man who not long ago was a policeman, and who, fancying there was an opening for a Chemist and Druggist, had commenced business, and was at that time serving the public with medicines during the day, and, for aught he knew, turning out in the night as policeman. Another had lately been an errand-boy, and had commenced business, although quite incompetent. He could mention other cases. If persons of that description were to be admitted into the Society by the signature of six Chemists and Druggists, it would be many years before the Society could acquire the character to which the Members aspired. Nevertheless, he should continue to support it, but thought the abuse to which he referred should be guarded against.

Dr. Edwards explained, that the proposed form of certificate required that the persons signing it should be Members of the Society. Inquiry would be made in each case, and the candidate must be certified to be a person whom it was desirable to admit.

Mr. Clarke (of Richmond) thought indentures of apprenticeship should be produced, as well as certificates, from those with whom the candidates had lived as Assistants.

A Gentleman (not a Member) complained of the injustice of requiring Assistants to pass an examination. He said he had been an Assistant for many years, he had managed businesses, and was fully competent to undertake any department, yet he was excluded from joining the Society without examination, because he had happened not to go into business on his own account.

Mr. Hooper (Great Russell Street) said, that if the last speaker was so fully competent, which he had no reason to doubt, he could have no difficulty in passing the examination, which at present was a lenient one, although it would shortly be more severe. With regard to the remarks of Mr. Bland, he doubted whether the policeman or the errand-boy referred to would be able to obtain the signatures of six Members to their certificates, unless it happened that, by unusual application and industry, they had qualified themselves; and if this were the case, they would be eligible for admission whatever might have been their origin. Many scientific men had raised themselves to eminence under great disadvantages.

[The former speaker was about to reply, when he was reminded that, not being a Member, he was not entitled to take part in the discussion, although he had been admitted to the meeting by courtesy.]

Mr. Waugh thought the extent of liberality to be exercised in the admission of Members was a serious question. If it were proposed to admit ninety-six out of one hundred of the parties now styling themselves Chemists and Druggists, this would lower the standard of qualification and injure the character of the Society. The question required much consideration, and should not be decided hastily.

Mr. William Southall (Birmingham) said it was desirable to arrive at a unanimous decision. The resolution was a very general one: the suggestions which had been offered were valuable, but he thought the details should be left to the Council, who would make full inquiry into the merits of each case. He might observe, that no thanks were due to those whom it was proposed to admit; they had held themselves aloof until now, waiting to see whether the exertions of others would be attended with success. Finding that the Act had passed, they began to think they might as well take a share in the benefit, although they had lent no assistance. It might be a wise and just policy not to exclude them, but their claims should be carefully scrutinized by the Council.

Mr. Hooper remarked, that the Members recently admitted were let off very easily. The original Members had paid, since the commencement of the Society, in regular subscriptions, above twenty guineas, and many of them had given donations, raising the amount to thirty or more.

The resolution was put and carried unanimously.

Mr. Morson, in moving the third resolution, said he thought such a resolution was scarcely necessary. It must be obvious to every Member that it was his duty to encourage his Assistants and Apprentices to study and prepare for the examination. His own credit was at stake, and he must be aware, that unless he performed his part in bringing his young men forward, they would not be efficient, and he would be the sufferer in the end. He moved—

"That the Pharmacy Act having been passed for the purpose of elevating the character and status of the Pharmaceutical Chemists of Great Britain by means of improved education, this meeting considers it of the highest importance that the Members of the Society should afford every encouragement and facility to their Assistants and Apprentices for preparing themselves to pass the examination."

Mr. Yarde seconded the resolution.

Mr. Bell said the resolution was by no means superfluous or unnecessary. In his correspondence with Assistants and Apprentices, he heard frequent complaints of the difficulties thrown in their way with regard to study and scientific improvement. Many who were within reach of lectures were not allowed to attend, and were very badly supplied with books. It was true that some young men, although urged to attend lectures, would not take the trouble, but in most cases the obstacle was on the other side. He thought it important that the attention of Chemists generally should be directed to the subject.

Mr. Southall fully confirmed the observations of the last speaker. He had in his experience observed a great indifference on the part of employers to the education of their young men, a circumstance much to be regretted.

The resolution was put, and carried unanimously.

Moved by Dr. Edwards, seconded by Mr. W. Bartlett,

"That the thanks of the Society be given to Mr. Jacob Bell for his energetic exertions in promoting the passing of the Pharmacy Act through Parliament."

Mr. Bell, while he fully appreciated the feelings which had dictated the resolution, regretted that it had been moved, as the progress which the Society had made was the result of the union of the Members. No individual could have been successful in any such undertaking unless well supported by his brethren, and he had always endeavoured to place this fact prominently before the Members. The only vote of thanks which he ever desired was the practical

acknowledgment of the value of the Act, by the zealous and harmonious co-operation of the present and future Members of the Society in carrying it into early and complete operation.

Moved by Mr. J. Bell, seconded by Mr. T. N. R. Morson,

"That the thanks of this meeting be given to the President for his services as Chairman."

Carried unanimously.

LIVERPOOL CHEMISTS' ASSOCIATION.

Pharmaceutical Meeting, 18th June, 1852.

MR. SHAW, PRESIDENT, IN THE CHAIR.

Mr. Mercer delivered a lecture on "Quinine and its Adulterations." He commenced by giving a sketch of the natural history of the cinchonaceæ, more particularly with reference to the officinal barks of the Pharmacopœia, and referred to the many discordant and contradictory statements respecting the sources of these barks; for the distinctive characteristics between different species were in many instances so slight, that almost every fresh investigator had invalidated the statements of his predecessors. As a proof of our imperfect knowledge, he said the sources now given in the Pharmacopœia were entirely different to those given by the College in 1836, and yet the same barks were meant.

Directions for the manufacture of disulphate of quinine were introduced into the Pharmacopœia of 1836; but as it was an article which the Pharmaceutist could not economically manufacture on a small scale, but always obtained from the wholesale manufacturer, it had in the last edition been very wisely removed from the preparations and placed in the Materia Medica.

The methods to obtain quinine ordered by the different Colleges were contrasted, and the *rationale* of each process explained. Its chemical characteristics were then mentioned, and the remarks of the Pharmacopœia as to the usual impurities and tests criticised.

Mr. Mercer noticed several adulterations not alluded to in the Pharmacopœia, and highly recommended the simple test of sulphuric acid, by which most of the usual adulterants of quinine were detected, viz., sugar, starch, salicine, phloridzine, and crystalline fatty matters. It has been urged against this test, that all organic bodies are decomposed by sulphuric acid, and therefore it is not able to detect the admixture of one organic body with another. Such is not the case: most organic bodies are charred by concentrated sulphuric acid, but quinine is an exception, and there are a few other bodies as well, such as citric, benzoic, and tartaric acids, or bitartrate of potash, which of course, if their presence is suspected, must be sought for with the appropriate tests.

The detection of cinchonine and quinoidin is very easily effected, for ether possesses the property of dissolving quinine, but neither of the other alkaloids, and he recommended the adoption of the process described in the Pharmaceutical Journal for last March.

The lecture was illustrated by diagrams.

Mr. Abraham delivered a short lecture on the elementary gases.

ANNUAL MEETING OF THE LIVERPOOL CHEMISTS' ASSOCIATION.

Thursday, 29th July, 1852.

Mr. Shaw, President, took the Chair; and called on Mr. Abraham, the Secretary, to read the following Report of the Council:

"Your Council have done all in their power since the Annual Meeting in November last, to fulfil the objects for which the Society was founded, and they hope their proceedings have been generally acceptable to the Members. The Pharmaceutical Meetings have generally been as well attended as formerly, though by no means so well as they could wish. A better attendance at these Meetings would encourage the Council very much, and they venture to think that it would promote the interest of all the Members.

"The Society is much indebted to several scientific gentlemen who have lectured for us during the past year. They beg to record their obligations to Doctors Brett, Inman, and Nevins, and to Messrs. David Waldie and T. C. Archer.

"The attention of the Council has been given to the subject of the supply of medicines to emigrant ships. Her Majesty's Land and Emigration Commissioners have for some time required that all vessels chartered by them shall be furnished with medicines from the Apothecaries' Hall, in Blackfriars Lane. They have taken this course in consequence of the bad quality of medicines previously supplied. This complaint is doubtless just, and if there were no remedy but that adopted by the Commissioners, your Council would not complain. But they think that a remedy could have been found without giving a monopoly to one establishment, and they apprehend that the correction of the evil is in the power of the Commissioners themselves, who are empowered by the Passengers' Act to appoint emigration officers, who are required to employ medical officers, a part of whose duty it is to see that the medicines supplied to all emigrant ships are genuine, and in sufficient quantity. Your Council apprehend that the just remedy for the evil complained of consists in rendering this inspection efficient. They do not mean to blame any individual, but various sources of information lead them to believe that it is not so at present. The complaint of the Commissioners proves it. Your Council conceive that the inspection should take place at a depôt, where the examiner should have at his command every needful instrument and reagent, to enable him to examine the whole or any number of the articles. He ought not to come in contact with the party who supplies the drugs. The emigrant ships chartered by the Commissioners form but a small part of the total number. In providing for the others, the shipowner is satisfied to take the lowest tender, because the contractor is bound to obtain the certificate of the medical inspector; and the owner feels himself thus relieved from responsibility. But if the inspection is insufficient, it may be questioned whether the pretence of it does not aggravate the evil. The subject will receive the further attention of the Council.

"They have to refer with satisfaction to the passing, during the last Session of Parliament, of a Pharmacy Bill, which, although by no means such a measure as they had contemplated, will, they hope, eventually much improve the practice of Pharmacy. It provides that no person shall assume the designation of 'Pharmaceutical Chemist' unless he be a Member of the Pharmaceutical Society. This designation is not at present of any value, but your Council have reason to believe that the Pharmaceutical Society are disposed to add to their number all the respectable Chemists and Druggists now in business. Should this be so, and a large proportion of them accept the offer, a distinction would soon be created, and the Act would become in effect compulsory. Future additions would only be made after examination, and the standard of qualification would be raised. The Council cannot refer to this subject without expressing their sense of the services of Mr. Jacob Bell, who, in Parliament and otherwise, has done much to deserve the respect and gratitude of the Pharmaceutical body.

"The attention of your Council has been directed to the desirableness of forming a Museum of Pharmaceutical Preparations and Materia Medica. The principal difficulty would be to find an accessible place for its deposit. If they are able to obtain one in the Town's Museum which is to be formed, they will call on their Members to co-operate in the accomplishment of the object.

"The Members are aware that a class for the study of Pharmaceutical Chemistry has been conducted by Dr. Edwards. Ten students entered their names, most of whom have diligently availed themselves of this means of improvement, and your Council have no doubt that they will experience important advantages from it.

"Arrangements were made by which Members and Associates were admissible on favourable terms to the Botanical Lectures at the Liverpool School of Medicine, but your Council regret that this opportunity was made use of but to a very limited extent.

"The soirée held on the 22nd April by this Society, jointly with four other of the Literary and Scientific Societies of Liverpool, was most numerously attended, and many applicants were disappointed in their endeavour to obtain tickets. Your Council cordially embraced the opportunity of meeting the other Societies, and they hope that the results were agreeable to all.

"A small library of chemical works is at the disposal of the Members. A volume of Gmelin's *Chemistry*, and one of Lehmann's *Physiological Chemistry*, have been

added. Also (presented by Dr. Edwards), the Report of the Committee on the Pharmacy Bill.

"The balance-sheet will show that the expenses of the past year have been more than covered by the subscriptions, although a number of the latter remain to be collected. The surplus is much diminished, however, by a balance brought forward from the preceding year, and by the insolvency of a collector (Putland) employed during that period, who had retained a portion of our funds.

"We have invited the Chemists of Liverpool generally, and some of our friends from a distance, to be present at our Meeting, and we shall be glad to receive the names of those who are disposed to join us. Our interests demand an united body, and it can only fail of its intended effect through the apathy of those who ought to take part in it."

The CHAIRMAN moved the adoption of the Report. They would perceive that the Council had not been idle. He thought this large town ought to furnish a greater number of Members, and that if the Chemists of Liverpool were better acquainted with the character of the Society, the value of the lectures which had been delivered, and the means it afforded for mutual protection and assistance, many would be glad to join them. He had himself felt the unjust operation of the law which allowed a shipowner to come to him for medicines for one of his ships, whilst for the supply of another he was obliged to go to London.

Mr. SUMNER, in seconding the motion, said, although the Report was in itself so ample, he was induced to say a few words on the subject of the supply of medicines for ship chests. The Council, seeing how important this question was to a port like Liverpool, had sent special invitations to several of the Druggists who are most interested in it to attend their meeting, and were not a little surprised to find so much apathy where their own interest was so immediately concerned. Her Majesty's Land and Emigration Commissioners had adopted a course which would have a great effect upon the interests of those supplying emigrant ships; and before the present evils should be extended, it was necessary that some decisive step should be adopted by which the proper supply of medicines should be guaranteed to every class of ships. The Council were anxious to do anything that would tend to further this object, and hoped to have the co-operation of all whose interests are identified with this important subject.

Mr. ABRAHAM thought it necessary, before the question was put, to remind the Members that this Report applied to a period of eight months only, whilst the preceding Report applied to a period of seventeen months. In proportion to the time which had elapsed the number of meetings had been more than twice as great as formerly.

The motion was then put, and adopted unanimously.

The PRESIDENT called on Dr. Edwards to give a report of the operations of the laboratory.

Dr. EDWARDS felt great pleasure in being able to give a favourable report of the progress and steady conduct of the pupils in the laboratory; with one or two exceptions, great diligence had been shown, and evidence had been given that opportunities at home had been taken advantage of as well as the course of instruction in the laboratory. He then explained the nature of the operations in the laboratory, the course followed being similar to that in the laboratory of the Pharmaceutical Society in London, and showed specimens of preparations made by Mr. J. Willcox and Mr. Henry Fisher, who both deserved great commendation. An examination of the students had resulted in awarding the prize, which the President had kindly placed at his disposal, to Mr. J. Willcox, an apprentice of Mr. R. Kirkus, to whom he had great pleasure in presenting it.

The volume presented was a bound copy of Phillips' *Translation of the New Pharmacopœia*.

Mr. FISHER, as one of the laboratory students, expressed their obligations to Dr. Edwards, and moved a vote of thanks to him; which was seconded by Mr. KIRKUS, and carried unanimously.

The vacancies in the Council, by the retirement of Messrs. Edward Evans, Clay, and Mercer, were then ballotted for, and these gentlemen were re-elected.

Mr. MERCER again called the attention of the meeting to that portion of the Report which referred to the supply of medicines to emigrant ships, and said that it had become a subject of great importance to the Druggists of Liverpool, since Government had established an Emigration Depôt here; indeed, during the last week, four vessels, chartered by the Emigration Commissioners, had left the port, the medicines supplied to which would amount to about £200, and he had no hesitation in saying that within the present year medicines would be required for Government ships to the amount of upwards of £3000, none of which would be furnished by the local Druggists, as all the medicines must be obtained from the Apothecaries' Hall, London; and he urged upon the meeting the necessity of cordially co-operating with and supporting the Council in their endeavours to obtain the rescinding of a regulation which so materially affected the interests of every Druggist in the town.

Mr. JACOB BELL said that the subject had received the attention of the Members of the Society in London, and he had been one of a deputation which waited on the Commissioners to represent the grievance. The Commissioners, however, showed such unanswerable evidence of the frauds which had been practised, that the necessity of some change was evident, and the deputation retired, unable to obtain redress, but recommending a more efficient examination of the chests. The Commissioners said it was impossible for them to ensure the good quality of the medicines by any examination of the chests, which could be practically carried out.

Mr. ABRAHAM said the Act of Parliament imposed upon them the duty of doing this by their officers, and such an answer was an abnegation of their functions.

The CHAIRMAN informed the meeting that Mr. Jacob Bell had attended for the purpose of making a few observations on the Pharmacy Act.

Mr. BELL briefly noticed the origin of the Pharmaceutical Society, and the steps by which they had progressed in their endeavours to effect a complete organization of their body for the purposes of defence and improvement. The pretext for the attacks which had led to the formation of the Society, having been the admitted incompetence and irregular proceedings of persons carrying on business as Chemists and Druggists, the discredit of which had been shared by the whole body, the mode of defence which naturally suggested itself was the organization of all regularly educated Chemists, the improvement of their qualification, and the separation of those who are thus qualified from the miscellaneous class of persons who sold drugs, but who had no pretensions to the title of Chemist. In proportion as the Society had progressed, more especially in the arrangements respecting education and examination, it had acquired influence and stability; but without legislative sanction it could never hope to carry out to the full extent the objects for which it had been founded. The passing of the Pharmacy Act was an important step. The legislature had now constituted the Pharmaceutical Chemists the representatives of Pharmacy, and given them the power of regulating their qualifications, raising the status of the body and shaking off the irregular and incompetent dealers in drugs with whom they had hitherto been classed without distinction. The Act was not of that compulsory and monopolizing character which they had originally desired, and had been undervalued by some persons on that account. It was, however, in the power of the Chemists themselves to attain by means of this Act everything which they could reasonably desire. Its value and efficiency would depend upon the spirit with which they adopted and carried it into operation, and the present was the time to decide what steps should be taken for this purpose. Mr. Bell explained at some length the provisions of the Act, and the manner in which it would realise the objects in view, and pointed out the necessity of uniting under the title of Pharmaceutical Chemists all those who could substantiate a claim to the distinction, in order to establish, without delay, the complete separation of the class of Chemists recognised by the Act, from the incompetent dealers in drugs. The extension of the basis of the Society by the admission of new members appeared to be very desirable, and it would be well to consider the propriety of adopting a liberal construction of the regulations respecting the admission of Chemists already in business in order to afford every facility for adding to the list of members. This remark applied to those who, although connected with the business for some years, had not commenced on their own account until after the date of the Charter, and who could produce certificates or other satisfactory evidence of their eligibility. A special meeting of the Council would be held on the following Wednesday, when the provisions of the Act would be considered, and it would be an advantage to the Council to know the opinions of the Members in the country on this question. The Liverpool Chemists' Association had been a valuable auxiliary to the Society, and although not officially connected with it, the progress of that Association had been watched with interest by himself and

other Members of the Society in London. He had always looked forward to the amalgamation of the two Societies, as he was desirous of seeing a complete organization of the Pharmaceutical Chemists throughout the country, with a Secretary in every town through whom official communications could be made. The advantage of such organization, even when imperfectly carried out, had already been practically demonstrated, and if this could be extended to every town in the kingdom containing three or four Pharmaceutical Chemists, the facilities for communication would be a means of uniting the Members more closely, and would greatly increase the influence and strength of the Society. As Liverpool generally took the lead in promoting useful undertakings, he had been glad of the opportunity of attending that meeting, and had no doubt as to the cordial concurrence of the Members of the Association in the desire which he had expressed for the permanent union of all duly qualified Chemists and Druggists into one body under Act of Parliament, and their complete organization for mutual improvement and advantage.

Mr. ABRAHAM said he had drawn up a Resolution which he thought would express the general feeling of the Association. He moved: "That in the opinion of this meeting, it is highly desirable that the Pharmaceutical Society and the Chemists and Druggists of the United Kingdom should avail themselves of the Pharmacy Act for the purpose of forming a body which shall include all those who are qualified, in the number of Pharmaceutical Chemists."

Dr. EDWARDS seconded the resolution. He considered the Act a very important and beneficial one, which might be made extensively useful. It was, however, necessary that the Society should include all who are worthy to adopt its distinguishing title. He should, therefore, urge upon the Council to consider carefully the clauses of the Act, which he thought empowered them to adopt a more liberal policy than had hitherto been expedient. This, however, should be limited in its duration, having special reference to the present position of the Chemists on the passing of the Act; and whatever leniency might be extended to those who were already in business should be only temporary; an early period being fixed, after which, the power granted by the charter to admit Members without examination should no longer be exercised in any case. This would be the means of extending the operations of the Society, and ultimately raising the standard of qualification. It must not, however, be expected that all the evils arising from excessive competition, mistaken policy, or individual delinquency, would at once be removed by an educational qualification. These would undoubtedly diminish, and especially under the influence of social intercourse in the several localities, which would promote harmony and a good understanding among the members. Hence the advantage of branch associations, which he thought likely to remove many evils beyond the reach of a mere educational centre. He trusted that both the centre and the branches would be increasingly supported, which would benefit the Members, socially, morally, and professionally.

Mr. T. D. WALKER inquired what arrangements had been made by the Council of the Pharmaceutical Society for the admission of Chemists who had gone into business since the date of the charter.

Mr. BELL replied that the regular mode of admission was by passing the examination. The charter had made an exception in favour of persons in business at that date, and those who should be duly certified to be qualified. The Council had the power to adopt a more liberal interpretation of the charter than they had hitherto done; and they were desirous, under existing circumstances, to offer every facility for the admission of all who might be found eligible, but he was not prepared to state in what manner this might be effected.

Several Members having expressed their approval of the resolution, it was put and carried unanimously.

Mr. H. SUGDEN EVANS congratulated Mr. Bell on his success in reference to the Pharmacy Act, which although a partial measure, placed them in a position to gain the confidence of the public, and to prove themselves worthy of increased powers at a future time. They must all co-operate harmoniously, lay aside minor differences and jealousies which so much tended to retard improvement. All who aspired to respectability in their profession, would naturally be anxious to avail themselves of the distinction offered by the Pharmacy Act to those who came under its operation. The advantages of local association would be felt by bringing the means of improvement to the doors of the students. The success of the parent Society should be an incentive to increased exertion in the provinces, and by these united efforts the

standard of British Pharmaceutists might be raised far above that of their continental brethren. The present Members must lay the foundation of the edifice, but the rising generation would raise up the fabric, which would gain for the profession of Pharmacy in Great Britain a world-wide fame. Some of the young men, though able and willing to lend their aid, were so bound down by hard drudgery and labour from early dawn till past nightfall, that the remaining hours were scarcely sufficient for necessary repose, and left little or no opportunity for mental culture. He therefore appealed to the principals, urging them to make such arrangements with reference to the hours of business as might be found practicable for enabling their young men to gain that knowledge which could only be acquired by study, and by which means alone they could be expected to become qualified for the honourable position which they were destined to fill, with credit to themselves and safety to the public. He moved a vote of thanks to Mr. Bell.

Mr. ALPASS seconded the motion.

Mr. BELL reminded the meeting that Mr. Macfarlane, of Edinburgh, a Member of the Council, was present. He acknowledged the kindness of the mover and seconder of the resolution, but hoped Mr. Macfarlane's name might be added, as that gentleman had rendered important service to the Society, and was the representative of Pharmacy in Scotland. He was desirous of abolishing the words England and Scotland with reference to Pharmacy, and substituting Great Britain. It was one nation only intersected by a small river.

The resolution was amended accordingly, and carried unanimously.

Mr. MACFARLANE, in acknowledging the vote, said he had not, in the first instance, taken an active part in the management of the Society. He had joined it at the commencement, because he considered it likely to be useful, and he was always glad to unite in any undertaking likely to produce public benefit. He did not himself anticipate any personal advantage from it, yet he always took an interest in the Society, as being likely to benefit the rising generation, and raise the character of the profession. In Scotland, as in England, there was much need of improvement. He did not think the improved education of the Pharmaceutical Chemists at all likely to make them medical practitioners; on the contrary, he quite agreed with Mr. Bell in thinking that it would have the opposite effect. His own experience led him to this belief. He had been originally educated for the medical profession, and was legally qualified to practise, but he found it utterly impossible to combine the two, and having embarked as a Pharmaceutical and manufacturing Chemist, he relinquished medical practice altogether. Sometimes patients would even now come to consult him, but unless the case were a very trifling one indeed, he always advised them to call on a medical man. He had no desire to practise. He was a Chemist, and it was not the business of a Chemist to practise medicine, and he was sure that the more they were educated in Chemistry, the more they would be disposed to think and act as he did. He need not enter into any further remarks on the Pharmacy Act, as it had been fully explained. He could only say that he highly approved of it, and hoped the Chemists would unite cordially in carrying it into full effect. The subject was exciting considerable attention in Scotland just now, and many new Members had been admitted. As his business arrangements would prevent his attending the Special Meeting on Wednesday, he had made Liverpool on his way hence for the purpose of being present at that Meeting, which had given him very great pleasure.

Thanks were voted to the Chairman, and the meeting separated.

MEETING AT MANCHESTER.

On Friday, the 30th of July, a Meeting of Chemists and Druggists was held in the Library Hall of the Athenæum, to discuss the provisions of the Pharmacy Act. Several members of the medical profession were present.

Mr. THOMAS STANDRING, Chairman of the Manchester branch of the Pharmaceutical Society, was in the Chair, and opened the Meeting by giving a brief analysis of the provisions of the Pharmacy Act. He called particular attention to the clauses, prohibiting unregistered persons from assuming the name of Pharmaceutist or Pharmaceutical Chemist, or using any name or sign implying that they were connected with the Pharmaceutical Society. He considered this Act a step in the right direction. It would place the Pharmaceutical body in a more creditable

position than that which they had hitherto occupied; and would enable them to acquire a professional character, to promote the advancement of Chemistry and Pharmacy, and to separate themselves from the general dealers, with whom they had previously been classed, without any recognized distinction. Mr. Jacob Bell would offer some further remarks on the provisions and tendency of the Act.

Mr. Bell said, that this measure did not confer a monopoly on the Pharmaceutical Society. It would not prevent persons unconnected with that Society from carrying on business as Chemists and Druggists; it simply recognized a qualification, and conferred upon those who should come under its operation a distinctive title and status, which others were prohibited from assuming. Consequently, this Act placed in the hands of the Pharmaceutical Chemists the power of constituting themselves a regularly educated body, and excluding from that body those who merely sold drugs in connection with groceries, colours, and a variety of other things. Of course, if an educated man found it necessary, from peculiar circumstances or local custom, to add that kind of business to that of a Chemist, he would not be thereby excluded from the privileges of the Society; but it would prevent a dealer in these commodities, who had no chemical education, but merely devoted a corner of his shop to the sale of drugs, from pretending to the rank of a Pharmaceutical Chemist. The tendency of the Act would be to promote the separation of Pharmacy from grocery; not by compulsion, but by the natural influence of improved education, which would induce the Pharmaceutical Chemist to devote his attention more exclusively to his own legitimate business. If this measure should be generally acted upon, it would be necessary for all those who desired to hold a respectable position as Chemists to join the Society. This would stimulate the rising generation to study, and pass the examination, by which means alone they could be admitted. Mr. Bell referred to the evidence taken before the Select Committee of the House of Commons, drew a comparison between the Pharmaceutists on the Continent of Europe and those in this country, and pointed out the cause of the superiority of the foreign over the English Chemists, namely, the education they were obliged to undergo, and the recognized qualification which they acquired. The ultimate effect of the Act would be to make the diploma of the Pharmaceutical Society a guarantee of qualification, entitling the possessor to the patronage of the public and the confidence of the profession. This would of course be a work of time; and it was for the Chemists themselves to decide when the desired result should be attained. They might bring the Act into immediate operation, by uniting together and adopting it, in which case the distinction would soon be recognized, and generally understood by the public; or they might be dilatory and indifferent, neglect the advantages offered, and defer the result for a much longer period. Some members of the medical profession being present, he took the opportunity of correcting the erroneous impression, that this Act would have a tendency to convert Chemists into Medical Practitioners; nothing was further from the intention of the promoters of the Act. They had been sufficiently warned by the previous experience and present amphibious position of the Apothecaries, whose example they had no desire to follow. They would resist a system of pains and penalties, and the liability to continual prosecution by rival Apothecaries, for alleged offences which it was difficult to avoid, and impossible accurately to define; but the principle of the Act was founded on a recognition of the necessity of a qualification for the performance of certain duties, and its tendency would be to discourage abuses, and to diminish, rather than increase, the source of jealousy between medical men and Chemists. In the original Bill, registration was made compulsory; it was therefore provided that all who had served, or were serving their apprenticeship, at the time of the passing of the Act, should be exempted from examination. The present Act made registration voluntary, therefore the exemption had been wisely omitted. It would be doing the young men no kindness to exempt them from the necessity of obtaining that knowledge, which was essential to the efficient performance of their functions as Pharmaceutical Chemists; and he was sure that the national emulation and ambition of young men would induce them to look forward to the examination without dread, and having passed, they would have no cause for regret. Those who had no ambition of this kind would not be obliged to join the Society; it would soon, however, be found that those who had passed were most qualified, and would generally be more successful in business, than those who were satisfied to remain stationary instead of advancing with the times. Before the passing of the Act,

when the certificate of examination conferred no legal distinction, there where many young men who voluntarily presented themselves, and some of them had passed with great credit. The Society comprised about 1600 Members, besides Associates. The number was likely to be considerably increased. Those who were in business prior to the date of the Charter could be admitted by a special provision of the bye-laws. There were some who had commenced business since that date, whom it was desirable to admit by a liberal interpretation of the Charter, without passing the ordeal provided for young men at the time of commencing business. Those who had been some time in business might reasonably object to passing this ordeal, lest it should be taken to imply that they had not been competent when they commenced. As it was desirable to extend the basis of the Society, it had become a question for the Council to consider in which manner such cases might be provided for, without infringing the spirit of the Act, or lowering the standard of qualification of the Society. On Wednesday next, a Special Meeting of the Society would be held, when this subject, in connection with the provisions of the Pharmacy Act, would be duly considered; and it was desirable that the opinions of Members in the country should be known. At a Meeting, held at Liverpool on the previous day, the opinion was unanimous in favour of a liberal interpretation of the law, in extending the basis of the Society. A similar Meeting was to be held at Newcastle on Monday. After some further explanation of the provisions and tendency of the Act, Mr. Bell expressed a desire to hear the sentiments of the Members present.

Mr. Slegg asked several questions respecting the admission of Assistants and Apprentices, and of those who, having been brought up to the business, had left it for a time, and afterwards resumed it. He doubted whether an Act of Parliament could prevent any person from assuming a name or title.

Mr. Bell replied, that the several cases referred to would be considered on their own merits, with the desire on the part of the Council to exercise as much indulgence as the law would allow. With regard to the power of the Act to prohibit the illegal assumption of the name or title referred to, no doubt could exist on that point. The Act did not deprive a man of the power of carrying on business, it simply recognized a certain class of persons, having certain qualifications, and a corresponding title, and prohibited a fraudulent pretension or use of such title by persons who had no right to assume it.

Mr. Burgess made some inquiries of a general nature, involving the principles on which the Society had been founded.

The Chairman said he thought the questions had been already answered at that meeting, but he should be happy to give any further explanation at a private interview.

Dr. Edwards, of Liverpool, said that, being a member of the Council, and having attended the meeting at Liverpool, he was glad of the opportunity of ascertaining whether the opinions at Manchester coincided with those which he had previously heard expressed. He could state that at Liverpool a very strong feeling prevailed respecting the importance of extending the basis of the Society. It must be recollected that the Members had great influence over their Assistants and Apprentices, and that the character of the Society would be greatly affected by the extent to which education was promoted and improved. By the exclusion, on technical grounds, of any Chemists of the present time who could establish a fair claim to recognition, and who might desire to join the Society, these parties, instead of becoming valuable allies, would be estranged from the Society by the feeling that they had no part in it; consequently their young men would be indifferent, and would not be likely to come forward as future Members. This would tend to perpetuate the old system, or, at all events, it would delay for an indefinite period the accomplishment of the object for which the Act had been passed. He was glad to hear that it was in contemplation to associate in Manchester for the purpose of holding Pharmaceutical Meetings, for the delivery of lectures, and the promotion of education. They had an Association at Liverpool having these objects, and it had tended to keep the Chemists together, to stimulate the young men, and promote reciprocal good feeling among them.

Mr. Macfarlane, of Edinburgh, expressed the pleasure he felt in attending the Meeting. He had been a Member of the Society from the commencement, because he thought it was a step in the right direction; very few, however, in Scotland had joined it until lately. They had now a Board of Examiners ap-

pointed in Edinburgh, and the attention of the Chemists had been directed to the subject, by the circumstances connected with the Pharmacy Bill, which had now been passed into an Act. At first some difficulties had occurred, similar to those which had been noticed at that Meeting with reference to the admission of Members; some cases presenting peculiar features, and requiring separate consideration. The Board had met and investigated the facts of each case, and the qualifications of the candidates, and all difficulties vanished. Within a few weeks about sixty Members were admitted, and he had no doubt that the number would, before long, be considerably increased. A Committee had been appointed, and they were about to establish a museum and library. He was glad to find that at Liverpool and Manchester active proceedings were in progress. His business engagements would prevent his attending the Meeting in London on Wednesday; he had, therefore, been glad of the opportunity of being present at Liverpool and Manchester, and hoped they would persevere in promoting the objects they all had in view.

The Meeting appeared to concur in the sentiments which had been expressed.

Mr. Robertson moved—"That it is advisable that the Members of the Pharmaceutical Society in Manchester should co-operate with the Council in London, for the purpose of admitting, as Members of the Society, such members of the trade as are duly qualified."

Mr. Booth, of Rochdale, seconded the resolution, which was carried unanimously.

Mr. Woolley expressed his cordial concurrence in the resolution which had been passed, and in the sentiments expressed by previous speakers. He could not allow the Meeting to pass without moving a vote of thanks to Mr. Bell, Dr. Edwards, and Mr. Macfarlane, who had travelled a considerable distance for the purpose of giving them that information which, as Members of the Council, they were enabled to afford, and who had always taken an active part in promoting the welfare of the Society.

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

Mr. Mumbray moved, and Mr. Lynch seconded, a vote of thanks to the Chairman, which was also unanimously carried.

MEETING AT NEWCASTLE-ON-TYNE.

On Monday evening, August 2nd, a meeting of Chemists and Druggists was held at Newcastle-on-Tyne, for the purpose of discussing the provisions of the Pharmacy Act, and its prospective influence on the position and character of the Pharmaceutists of this country. Mr. Procter having been unanimously called to the chair, opened the proceedings by stating the object of the meeting, and expressing a hope that the Pharmacy Act would answer the expectations of its promoters; its influence would be gradual, but it would raise the position of the Pharmaceutical body, and confer especial benefit on the rising generation. Mr. Jacob Bell, who attended for the purpose of assisting in the discussion, would explain the provisions of the Act.

Mr. Bell said, that the last time he had the pleasure of meeting them (about three years ago*) he had illustrated the advantage of union among Chemists and Druggists for self-defence, by relating instances in which it had been of essential service, in enabling them to obtain the rejection or modification of threatened Acts of Parliament, which if they had been passed in their original form would have been highly injurious. He also pointed out the importance of improved education as a means of raising the status of the Pharmaceutical body, and the ground upon which they could expect to enjoy indemnity from future aggression; and endeavoured to prove, that in order to make this union permanent and effectual, it was essential that an Act of Parliament should be obtained. This Act had now been passed, and he should be able to show that, if the Chemists should come forward zealously and adopt it, it would raise their position, improve their qualification, and give them a professional character which they had not hitherto enjoyed. The Pharmaceutists on the Continent were all educated, passed an elaborate examination, and were looked up to with respect, while the Chemists and Druggists in this country were in a very different position. As an illustration, the invitations to that meeting were extended to members of the medical profession, not one of whom was present. This

* March 13, 1849.

was easily accounted for by the fact that Chemists and Druggists were looked down upon as uneducated tradesmen, with whom it was beneath the dignity of the members of a learned profession to hold conference, even on a subject in which that profession is interested in common with themselves. But let them place themselves in the position contemplated in the Pharmacy Act, and medical practitioners would no longer hesitate to assist at their discussions. They would be glad to obtain the advantage of their practical experience in Chemistry and Pharmacy, in which they (the Chemists) certainly ought to be more proficient than those whose time is chiefly occupied in medical practice. It was education which raised one man above another—mental cultivation was superior to rank or wealth. A man might begin life in a very humble sphere, but let him improve his intellect, exercise his talent, and acquire a character in science, art, or literature, and he would command respect. There was not a nobleman in the land who would not consider it an honour to have a Davy or a Faraday as his guest. Of course it was not to be supposed that Dispensing Chemists would rise to the eminence of the great men to whom he had referred, yet if all in early life obtained a groundwork of scientific knowledge, out of their ranks some would take a higher scientific position than their fellows, devote themselves to philosophical researches, and confer credit on the country, which was a frequent occurrence on the Continent of Europe. The minutes of evidence of the Select Committee contained satisfactory information on this subject. The opportunity was now before them. The Pharmacy Act, although some persons had doubted its efficiency, placed in the hands of the Chemists themselves the power of effecting all that was required. It recognized the Pharmaceutical Society, and provided for the registration of the Members as Pharmaceutical Chemists, conferred upon them a distinction which it was illegal for unregistered persons to assume, and placed in that body the office of regulating the examinations which must be passed by all future Members, with the exception of those who had previously been in business for a certain period. It was true that the Bill did not prevent unregistered persons from carrying on the business, but it created a distinction between the regular Chemist and the grocer or huckster who sold drugs. Those who came under the operation of the Act, would gain a larger share of the patronage of the profession and the public in the dispensing of medicines; and in the same proportion they would gradually reduce their grocery and mixed business. In some towns which he had visited, he found twenty or thirty vendors of medicines, but not one regular Chemist and Druggist. They had medicines on one side, grocery and colours on the other; some were partially qualified, others not at all—a very bad arrangement for all parties. The tendency of the Pharmacy Act would be to classify the business, and to introduce the division of labour for mutual benefit. The Act would also tend to encourage a division of labour between medical men and Chemists. It would not, as supposed by some of the witnesses before the Committee of the House of Commons, ruin one-tenth of the Apothecaries, and injure the remainder. It was not the intention of the Bill to convert Chemists into Medical Practitioners, but to establish a class of qualified Pharmaceutists, and to encourage the Members of each class to adhere to their own department. Mr. Bell further enlarged on the advantages of raising the status of Pharmaceutists, putting an end to the differences and disputes with medical men, promoting the early and extensive operation of the Act, extending the basis of the Society by the admission of all Chemists already in business who could produce the requisite evidence of qualification, and encouraging Assistants and Apprentices to prepare themselves for the examination.

Mr. Walker said, in reference to Mr. Bell's remarks on the complaint that Chemists gave advice, that he believed in some cases it would be considered ill-natured not to give advice; he believed that no Chemist wished to do so unless in the most trifling cases not requiring medical advice.

Mr. Owen thought that unless the medical men and the Chemists could be induced to meet to confer on this subject, the Chemists would always find a difficulty in sending their customers to medical men, as they sometimes found, when they did so, that the parties were sent elsewhere for their medicine.

Mr. Walker thought this was not usual.

Mr. Owen stated two cases of recent occurrence in which he received prescriptions written in hieroglyphics, which he defied any Chemist to decipher, if he had gone through an examination.

Mr. WALKER thought the matter could not be legislated upon.

Mr. OWEN suggested a conference with medical men, which Mr. Bell thought would remove all the difficulty; but observed that, as Dr. Kitchener said, "Before you serve up your fish, you must catch them."

Mr. MAYS, of South Shields, referred to the practice adopted by some medical men of recommending patients to a Chemist, and sharing the profits. The Chairman said that some medical men in London attended during certain hours in the day to prescribe in Chemists' shops.

Mr. E. W. CHALLONER thought the discussion was not exactly in accordance with the object of the meeting. The first thing to be done was for the Chemists to discuss their own affairs and the Pharmacy Act, which was before the meeting.

The CHAIRMAN thought the abuses referred to would be remedied when the Chemists were better educated. The character of the Society and the future prospects of the Members depended on education. He hoped the attention of Chemists generally would be directed to the Act, and that they would use their influence with their Assistants and Apprentices in reference to the examination.

Mr. CHALLONER thought it important to induce the Chemists to consider the Pharmacy Act, which could only be effected by forming a Committee; and if Mr. Benjamin Gilpin would act as their Secretary, he thought something might be done.

Mr. SCHOLEFIELD supported this proposition, and suggested that the Committee should be extended to all the towns in the district in order to spread the information on the subject as much as possible, and awaken the interest of the Chemists generally.

Mr. BELL thought much advantage would arise from the formation of such a Committee. If he could be of any service in promoting the object, he should have much pleasure in attending a future meeting on receiving due notice, as the railroad had brought Newcastle and London very near to each other.

Mr. E. WILSON CHALLONER moved—

"That it is advisable that the Members of the Pharmaceutical Society in Newcastle, Gateshead, and the neighbourhood, should co-operate with the Council of that Society in London, for the purpose of admitting as Members such of the trade as are duly qualified."

Mr. GILPIN, in seconding the resolution, which was carried unanimously, said, the Pharmaceutical Chemists should seriously consider the necessity of raising their status and qualification, and that they should take advantage of the opportunity afforded by the Pharmacy Act of establishing themselves as a recognized class of educated Pharmaceutists. The prospective benefits of the Act would be exemplified in the superior qualifications of the rising generation. In the meantime it was desirable to extend the basis of the Pharmaceutical Society, through whose instrumentality the Act was to be carried into operation.

Mr. WALKER moved, and Mr. CHALLONER seconded, the appointment of Mr. B. Gilpin as Secretary, and the following Members as a Provisional Committee, with power to add to their number, to act in concert, and forward the views of the Council of the Pharmaceutical Society in London; and that Mr. Benjamin Gilpin be appointed Secretary: Messrs. William Procter, James Gilpin, E. W. Challoner, George Currie, Walter Swan, Edward Walker, R. Owen, of *Newcastle*; Mr. Cornelius Garbutt, of *Gateshead*; Messrs. R. J. J. Mays, and Henry Scholefield, of *South Shields*; Mr. R. Swan, of *Alnwick*; Messrs. R. Forth, and S. Mease, of *North Shields*.

It was moved, seconded, and carried unanimously, that a detailed report of the meeting be printed and circulated in Newcastle and the neighbouring towns.

Mr. CHALLONER expressed his satisfaction at the unanimity which had prevailed at the meeting, and anticipated a favourable result from the appointment of the Committee.

A vote of thanks to the Chairman was carried unanimously.

MEETING AT NOTTINGHAM.

A MEETING of Chemists and Druggists was held at the Assembly Room, Nottingham, on Tuesday, the 3rd of August, to consider the Provisions of the Pharmacy Act.

Mr. HEDDERLEY was unanimously called to the Chair, and having stated the object of the Meeting, expressed his hope that the endeavours which the Chemists had

been making to improve their position would be attended with ultimate success. The Pharmacy Act was a step in advance, and he hoped it would be found effectual. He should not enter into a detailed notice of the provisions of the Act, as Mr. Jacob Bell had attended for that purpose.

Mr. BELL observed, that some difference of opinion prevailed respecting the Pharmacy Act which had lately been passed. He had given much attention to the subject, and he believed it to be a sound and useful measure, calculated to produce much benefit. Mr. Bell referred to the evidence before the Select Committee, and explained at some length the provisions of the Act, its probable influence in promoting education, the way in which it would affect the present and future members of the trade, the regulations for the admission of Members and Associates, and the tendency of the Act to promote the separation of Pharmacy from medical practice, and also from the kind of general business which is at present often united with it. From the time of the establishment of the Pharmaceutical Society in the year 1840, he had been in the habit of occasionally visiting his brethren in provincial towns with the double object of giving information as to the proceedings in London, and informing himself respecting the nature of the business, and the sentiments of Chemists in different localities. He had found much difference in the views and habits of the Chemists in the localities which he had visited. There was no less difference in the amount of interest prevailing with regard to progressive improvement. In some places the subject had never been duly considered; it appeared to be a new idea, and there was very little disposition to deviate from the beaten path by joining in a movement wearing rather the aspect of an innovation. In the first instance many difficulties presented themselves, much cold water was thrown over the project, and it was only the confident belief that success was "looming in the distance" which encouraged him and others, with whom he was co-operating, to persevere. This belief was strengthened by the circumstance that whenever he succeeded in bringing together the leading Chemists of any town, and obtaining a full and fair discussion of the question, the result was uniformly satisfactory—the meeting was unanimous. There might be prejudices or peculiar notions on minor points, but on the broad principle of the importance of union for improvement and defence, the facts of the case spoke for themselves and produced conviction. In several large cities or towns—Liverpool, Manchester, Bristol, Bath, Newcastle, and some others—this conviction had led to active proceedings, local associations had been formed in connection with the Pharmaceutical Society, or in furtherance of its objects, arrangements had been made for promoting education, and a stimulus had been given to young men to apply themselves to study. In other localities the soil was barren, and very little had been done. In one place he had invited all the Chemists, about forty in number, to a meeting, and only two attended. This was about eleven years ago. Since that time the Society had made progress and acquired influence; many of those who were indifferent at first were beginning to see the importance of the course which had been taken, and were disposed to join in the movement. The passing of an Act of Parliament would give a fresh impetus to the Society, and place it in a firmer position. At recent meetings at Liverpool, Manchester, and Newcastle, a strong opinion had been expressed in favour of extending the basis of the Society. He would be glad to hear whether the opinions in Nottingham coincided, and if so he would suggest the formation of a Committee for the purpose of assisting the Council in the steps which it might be considered advisable to take.

Mr. J. HARRISON, after having expressed his satisfaction at the statement and the explanation of the Act, said he had at first entertained an opinion, in common with many others, that the Pharmaceutical Society would not confer any benefit on the trade; but he confessed that he had lately altered his opinion, and he had now no doubt that considerable advantages would result from it. Its value as a means of defence had already been proved, and he thought it would stimulate young men to study and make themselves more efficient in their business. He therefore moved—

"That it is expedient to extend the basis of the Society, for the purpose of bringing the Pharmacy Act into more immediate and extensive operation: that it is desirable to invite all duly qualified Chemists and Druggists to join the Society, and to prevail upon Assistants and Apprentices to prepare for passing the examination.

Mr. CHEETHAM had great pleasure in seconding the resolution, as he had always given the Society his warm support, and was highly satisfied with the passing of the Pharmacy Act; although it did not go so far as he wished, yet it was a step in the

right direction, and if the Chemists and the young men would act up to it, he had no doubt that it would, in a short time, prove of great benefit to them. It was probable that he might not individually experience its influence, but it was calculated to improve the position of the Pharmaceutical Chemists generally, and he thought it was the duty of all to support it.

Mr. HENRY LARGE considered this was the time for the Chemists of Nottingham to come forward and join the Pharmaceutical Society, especially after the explanation they had just heard of the provisions of the Pharmacy Act, and the beneficial influence it was likely to produce if brought into general operation. There was another reason for uniting in a movement calculated to raise their position. The late local Inclosure Act had given such a stimulus to building, and to industry generally, that Nottingham would become one of the leading manufacturing towns in the kingdom; and it behoved the Chemists to keep pace with the times, to promote improved education, and advance their respectability. He moved "that a Committee be appointed to co-operate with the Council of the Society in London in carrying out the first resolution, and that the following be the Committee:—Mr. Hedderley, *Chairman*; Messrs. J. Harrison, Williams, Woodward, Parr, Wain, T. Harrison, Dudgeon, and Large."

Mr. WAIN seconded the resolution, which was carried unanimously, Mr. Large being requested to act as Secretary, to which he assented.

Mr. WILLIAMS moved—"That in the opinion of this Meeting it is expedient, during a limited period, to relax the stringency of the regulations respecting the admission of Members in the cases of Chemists who commenced business on their own account since the date of the charter, and who may be certified to be duly qualified, and likely to promote the objects contemplated in the Pharmacy Act." He remarked, that if the Council should accede to the terms of the resolution, they would be conferring a great boon on those Chemists who had not already joined the Society. If they would show a disposition, even at the eleventh hour, to admit those who had for several years stood aloof, and refused to co-operate in what they called a visionary scheme, he thought a great number of Members would be added from Nottingham and other towns, and the Society would in this way be much strengthened and enlarged. He also trusted some relaxation of the rules might be made in favour of Assistants who, for the same reasons, had not enrolled themselves, but who were now anxious to do so. He would make one remark on the evidence of the medical gentlemen before the Committee of the House of Commons, to which Mr. Bell had alluded. He thought *some* of those gentlemen took a very erroneous view of the question. Their argument appeared to be, "Do not educate Chemists too highly—keep them down: the more you enlighten them, the more they will encroach upon the medical profession." Now, his opinion was the opposite of this. He believed it would be found in every town that the greatest amount of quackery and prescribing was carried on by the most illiterate and ignorant men in the trade, who understood little, excepting by report, of the nature of the medicines they employed. In his opinion, the more extensive was a man's knowledge of the chemical nature and properties of medicines, the less likely he would be to tamper with those medicines.

The resolution was seconded by Mr. PARR, and carried unanimously.

Mr. BOOTH EDDISON (surgeon to the infirmary) expressed the pleasure he had derived in listening to Mr. Bell's remarks, especially those in answer to the impression which had prevailed that the education of Chemists was likely to induce them to encroach on medical practitioners. He highly approved of the laudable object the Chemists had in view, in seeking to reform and elevate themselves. Speaking for himself, he had no fears on account of the Pharmacy Act; he knew there were in most towns doctors without any diplomas, and that a certain amount of prescribing would always be carried on by such persons; but this, he thought, would be diminished rather than increased by the improved education and qualification of the Pharmaceutical Chemists. He wished them every success in their object.

After a few inquiries respecting the terms and mode of admission to the Pharmaceutical Society had been answered, a vote of thanks to the Chairman was unanimously carried, which terminated the proceedings.

MEETING AT BRISTOL.

A Meeting of the Chemists and Druggists of Bristol and Clifton was held at the room of the Fine Arts Academy, on the Drawbridge, on Monday evening, Aug. 9, when Mr. Jacob Bell attended to explain the provisions of the Pharmacy Act.

Mr. GILES being called to the Chair, and having stated the objects for which the meeting was convened,

Mr. BELL referred to his former visits to the Chemists of Bristol, observing, that on his first visit* at the time the Pharmaceutical Society was founded, the subject appeared to excite very little interest, but that subsequently† he had the pleasure of attending a very good meeting, at which much zeal and unanimity were manifested. It was difficult to sustain uniformly the activity of institutions of this description, which were liable to flag occasionally for want of some fresh excitement, unless their real object and importance were steadily kept in view. The passing of an Act of Parliament, recognizing the proceedings which had been taken by the Chemists of this country for the purpose of raising their qualifications and position, was an event which ought to stimulate them to continued perseverance and fresh energy. The Act which had been passed, although differing from that to which they had looked forward, placed their success in their own hands. But it was necessary that they should adopt it, avail themselves of the advantages it afforded, and use all their endeavours to bring it into early and general operation. (Mr. Bell explained the provisions and principle of the Act, and the course by which it might be made most effectual.) There were a few persons who were endeavouring to retard the influence of the Act, by circulating statements to the effect that it was useless and inoperative. This was not at all surprising. It was always the case, after the passing of an Act, that some persons put its merits to the test by trying its strength. For example, if an Act were to be passed for the more easy detection and punishment of rogues and vagabonds, the rogues and vagabonds would immediately lay their heads together to contrive some means by which the Act could be evaded and its object frustrated. So when an Act is passed for the purpose of raising the qualifications of Pharmaceutical Chemists, and uniting them into one body, there are persons who immediately run down the education, and endeavour to sow discord and dissatisfaction in order if possible to frustrate the Act. But, as the rogues and vagabonds in the former case would not come forward in their true character, but would naturally assume some plausible pretext for their opposition, so, in the case of the Pharmacy Act, the malcontents veiled their real object under the profession of zeal in the cause, and a disinterested desire to warn their neighbours against what they represented to be a delusion. No harm could arise from such futile attempts on the part of a few individuals to encourage disunion among the Chemists and Druggists who had for many years been endeavouring to establish themselves in a secure position, and to obtain the recognition of the Legislature. A little opposition would be of service rather than otherwise, by inducing inquiry, and inquiry would lead to the establishment of the truth, which must ultimately prevail. Several meetings had lately been held in the north of England, and a special meeting of the Society in London, all of which had been satisfactory, and afforded evidence of a general disposition on the part of the Chemists to unite in promoting and expediting the operation of the Pharmacy Act. It was unanimously considered desirable to extend the basis of the Society by the admission of new Members, and to induce Assistants and Apprentices to prepare for the examination. Chemists who were in business before the date of the Charter, were admissible on production of a certificate, the form of which might be obtained on application to the Secretary. A difficulty had arisen respecting the admission of those who commenced business after the date of the Charter and before the passing of the Act; but the Council hoped to be able to surmount this difficulty by means of a certificate affording evidence of due qualification and eligibility for admission. They were desirous of adopting the most liberal construction of the terms of the Charter and the Act, and the concurrent opinion of the Members in different localities on a subject of so much importance was desirable. The advantage of extending the Society must be obvious, as all the Members would naturally use their influence with their Assistants and Apprentices, by persuading them to study and come forward for examination. It would be a great mistake to suppose that the

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* August, 1841. † 12th November, 1849.

labours of the Society terminated with the passing of the Act. It was necessary to go forward, to continue united, and not to rest until the character of the pharmaceutical body in Great Britain had risen so as to bear comparison with that of the pharmaceutists on the continent of Europe.

Mr. Schacht referred to the difficulty in which the Society was placed by the necessity for exercising the incompatible functions of an educational and examining body, but explained that he understood some change was contemplated in the constitution of the school and its relation to the Society, which would remove all objection upon that score. He was anxious to take the present opportunity, which he thought was an occasion favourable for any expression of opinion upon affairs connected with the Society, to suggest the establishment of annual meetings for scientific objects connected with Pharmacy, which should circulate through the chief towns in the provinces, somewhat upon the model of the Provincial Medical Association. He thought that meetings of this character held annually in different localities would have the effect of stimulating the Provincial Members to a more active co-operation, and that they might often be made highly instructive, by selecting as the place of meeting towns which presented peculiar objects of manufacturing interest. He thought further, that it would be more easy to keep alive the spirit of assemblies of this variable description, as, in addition to the attractions which the several districts might present, there would be some local pride to influence the residents in each neighbourhood to support the character of the meeting in which they were most immediately concerned. It was well known that this feeling was strongly entertained in the various towns in which meetings of the British Association and other societies had been held.

Mr. Booker having experienced the advantages of the educational system provided by the Pharmaceutical Society, expressed his complete approbation of it, and hoped that this most important feature of its constitution would never be abandoned.

Mr. Bell approved the suggestion of the provincial scientific meetings, and felt sure that the Council would give it their best consideration. In reference to the circumstance of the education and examinations being conducted by the same body, he explained that it was contemplated so to separate the school from the Society, that the latter should have no interest in the revenues of the former; but that as educating bodies of this description were seldom, if ever, self-supporting, it would be necessary for the Society to continue some pecuniary aid to the school, which had always been largely supported from the same source.

Mr. R. W. Giles agreed in expecting great benefit from the adoption of Mr. Schacht's suggestion, which he thought would foster a scientific taste in the followers of Pharmacy. He thought it no inconsiderable merit in the scheme that it would afford a legitimate opportunity of combining technical improvement with that bodily relaxation which close attendance to an exacting occupation restrained to an injurious degree, and he was glad to find that it would have Mr. Bell's support with the Council. He did not doubt that the Council would entertain it cordially as a means which they had long desired for extending the Society's influence, and the benefits which it could confer amongst the provinces; for it had long been alleged as an objection that the benefits arising from the Society were confined to the metropolis. He had risen more particularly to express his opinion upon the comparative merits of the two Bills, the original and the amended Bill, and he thought it would be easy to show that if they had not got precisely what they wanted, it only rested with themselves to make that which they had obtained identical in effect with what they had applied for. The original Bill was unquestionably the most simple, since its own provisions were sufficient for carrying out its intentions. The amended Bill had the same intentions, viz., to create a distinction between the qualified and the unqualified Pharmaceutist for public protection, but it left it in the hands of the Pharmaceutical body to make this distinction generally understood. It was, therefore, imperative upon them to unite cordially with the Council of the Pharmaceutical Society to carry out this object, and it was equally the part of the Society to meet this co-operation with a liberal extension of those privileges which they were alone capable of conferring. He thought that the Council had pledged themselves to a liberal course by sanctioning the conditions of the original Bill, which had been tenderly careful of the interests of those who were already embarked in business, and that consistency now called upon them to pursue that path. He thought, further, that it would be expedient to adopt that course which would enlarge the basis of the Society, and to endow it with greater importance, greater influence, and more extended means to advance education amongst Pharmaceutical Chemists. He congratulated the meeting upon the success which had been achieved in obtaining a Bill, which, if not in every respect complete, would become complete if the trade willed it, and was at least good to this extent, that it had raised them to the position of a legally constituted body of qualified Pharmaceutists, whose privileges could not be overlooked in any future measure of medical reform. He begged to move—

"That this meeting desires to express to the Council of the Pharmaceutical Society its earnest hope that a liberal construction will be placed upon the provisions of the Pharmacy Act, as it applies to the existing body of Chemists and Druggists, in respect of their admission to the Membership of the Society, and expresses its cordial desire to co-operate with the Council of the Society in directing the effect of the Act to the improvement of the education and status of the Pharmaceutical Chemist."

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

Mr. Ponting proposed—

"That the Council of the Bristol Chemists' Association be invited to reorganize themselves for the purpose of co-operating with the Council of the Pharmaceutical Society."

He cordially concurred with the transactions of the Council of the Pharmaceutical Society, and particularly expressed his approbation of the proposed conditions, which Mr. Bell had explained, for the admission of Chemists already in business into the pale of the Society. He thought that the terms were liberal and conciliatory, and expected that the privileges offered would be very generally taken advantage of.

Mr. Cerr seconded the motion, which was unanimously adopted.

The thanks of the meeting were voted to Mr. Bell and the Chairman, and the proceedings terminated.

ORIGINAL AND EXTRACTED ARTICLES.

EXAMINATION OF PAVON'S COLLECTION OF PERUVIAN BARKS CONTAINED IN THE BRITISH MUSEUM.

BY JOHN ELIOT HOWARD, ESQ.

(*Continued from page* 62.)

No. 10. *C. cordifolia.*

I do not find in Pavon's collection any specimen of bark which I can refer to the *a vera* of Weddell.† This is remarkable, as the C. cordifolia is said by this author "to have been observed in almost all the localities in which the Cinchonæ grow, and is of all others that which travellers most frequently collect." It was first discovered by Mutis at Santa Fé de Bogota, and if we are to judge by the relative quantities imported, must be much more common in those regions than in Peru or Bolivia.‡ The bark of the younger branches bears a great external resemblance to that of C. pubescens, but has internally a more pliable and less rigid structure. A transverse section of cordifolia bark shows, under the micro-

† There is, however, in the herbarium of Pavon, a specimen which he has designated *Cinchona oruta, β inedita*, which Lambert has marked as follows:—"C. cordifolia, Mutis, var. secundum Mutisii iconem inedit, ni vehementer fallor," and see Weddell's *Histoire*, p. 61.

‡ The following remarks on the C. cordifolia of New Granada, were sent, together with specimens, by Don. J. M. Ristolfo, under date "Bogota, 13th December, 1850:"—

"C. cordifolia, No. 1.—The fruit of this species is long, yellow, and abundant, it is found in the forests under a higher temperature than the lancifolia. This tree is more abundant and thicker than the lancifolia.

"C. cordifolia, No. 2.—There appears to be some difference between this species and the former. The fruit is smaller and of a black colour. The fibres of the leaves have but little red, rather inclining to green."

The bark of these two varieties differs very slightly in appearance. It is described as very abundant, but varying in its products with the soil on which it grows.

scope, some few spicular or fibres like those of C. pubescens, figured by Weddell, Tab. ii., fig. 31, but intermingled with more cellular substance and with finer fibres.

The *var. β rotundifolia* is met with in this collection under

No. 30. *Cascarilla con hojas redondas de Quiebro de Loxa.*

This appears to be the C. rotundifolia of Pavon, on which Lambert remarks, "This is *a very distinct species*, being easily distinguished from all its congeners by its narrow cylindrical capsules and by the narrow linear divisions of its stigma." Dr. Lindley also says, "The species is perfectly distinct from all others." (*Flor. Med.*, p. 418.)

Whatever may be the case with this tree in regard to its botanical relations, its *bark* at least presents all the characteristics of *a very distinct variety*, and one, moreover, which from its frequency in the recent importations, it is important to notice as such. It constitutes that which is now called by the dealers "*ashy crown bark*" in English commerce; and the same is described by M. Guibourt under the head "*Quinquina Loxa cendré (B).*"

The external appearance varies; some of the pieces are almost smooth to the touch, but impressed with minute transverse cracks, and corrugated longitudinally; these often appear as if sprinkled with some white powder, from the adhesion of a crustaceous cryptogamic plant—others of the quills are covered with a kind of pustular eruption of corky warts, which M. G. thinks may be produced by the puncture of an insect. The quills are often abundantly adorned with specimens of Usnea, Stictæ, Parmeliæ, &c.; and in some sorts a sooty-black incrustation is very prevalent. This kind is, I believe, the "*Dunkle Jaen*" of the Germans; but it does not seem to differ from the former at all more than may be occasioned by growing in a more damp situation. I have found, in the "ashy crown bark," of quinine and quinidin 0.418, and of cinchonine 0.914 per cent. The "Dunkle Jaen" sort gave me of quinine and quinidine 0.457, of cinchonine 0.300 per cent. This may, therefore, be accounted a tolerably efficacious bark.

The internal fibre is remarkably straight and woody, and of a light brown colour. The taste is astringent and disagreeable.

Large quantities of this bark are now sold for pharmaceutical purposes.

No. 12. *Cinchona ovata.*

Dr. Weddell remarks that "no cinchona, unless it be the C. Condaminea, is so susceptible of variation with the soil and climate as the C. ovata."

This observation holds good with reference to the different kinds represented in Pavon's collection, but it becomes much more forcible when the *var. β rufinervis* of Weddell is included in the list. Indeed, there is no resemblance at all between the barks ranged under this head, so that, however in a botanical sense they may be *one*, in a commercial point of view they must be accounted *many* sorts; which might perhaps be classed as follows:

First sort.—The smooth-skinned or "pale" variety.
- α. With light brown substance, comprehending "Pale bark" and "Ash bark."
- β. With orange red substance.

Second sort.—The spotted variety, or Carabaya bark.
Third sort.—The exfoliating variety, or pseudo-calisaya of Weddell.
Fourth sort.—The corky variety.
Fifth sort.—The mammellated variety.
Sixth sort.—The hard-coated variety.
Seventh sort.—The fibrous variety.

First sort, α.

No. **5, C. ovata.—*Flor. Peruv.*

This is something like "ash bark," but whiter than the general average of

this sort. I have called this the "smooth skinned,"† or "pale" variety, because the epithet *pale* by itself does not seem to me to convey at all the real character of the bark.

There appears to have been established a prejudice against *white* or *pale* barks, of which the *cascarillo pálido*, and the "ash bark," the produce of C. ovata, had to partake, and that (as it seems to me) rather unjustly, as this species of cinchona is by no means poor in alkaloids. I have found, even in a mean-looking specimen of "ash bark," the following products:—Quinidin (crystallized) 0.61, cinchonine (crystallized) 0.86.

This was from a specimen very much resembling the one under consideration in the Museum, but the same tree grown in Bolivia affords a much higher result on the average, yet still retaining its predominant *quinidin* character.

The flat which accompanies the quill of this sort, gave me (in one trial) as much as 1.2 of quinidin, and 1.6 of cinchonine.

No. 16. *Pata de Gallinazo vulgo de Loxa* appears to be the same sort. It approaches "ash bark," but when the finger is passed over it feels rough like a fine sand-paper.

First sort, β.

No. 31.—C. ovata *cascarilla boba pata di Gallereta.* I have mentioned above that the great peculiarity of this sort consists in an orange-red colour of the substance, to which I may add the strikingly yellow-white (though mottled) foliaceous epidermis, which in some pieces becomes wrinkled and has long strings of warts opening one into the other. The bark is in quills one foot long and half an inch in diameter, the bark rolled in upon itself, with a brown derm, and cuts easily. I have never seen this kind in commerce.

Second sort.

The spotted variety, or *Carabaya bark*. This is not represented in Pavon's collection, but I have seen a specimen of it sent over quite recently under the same name (*Pata de Gallinazo*) as the first sort.

Third sort.

The exfoliating variety or pseudo-calisaya of Weddell. This is not found in the collection, but has been fully investigated by Dr. Weddell, and named by him var. β rufinervis. In this variety the C. ovata approaches to the C. Calisaya.

Fourth sort.

The corky variety. Woods No. 3. *C. quina pata de Gallinazo.* This kind is better represented in the "Collection Delessert," where it is called also *C. suberosa* by Pavon. It is remarkable for the abundance of cork which it produces, so that some pieces almost resemble the produce of the genuine cork-

† Buïz, in his *Quinologia*, remarks as follows—"Dealers in bark divide the article according to the epidermis, or the external colour of the skin, into seven peculiar and pretended different sorts, *even when the barks come from one and the same tree.*

"These sorts are called the black, *the grey*, the dark-coloured, *the ash-coloured*, *the white*, the sort party-coloured like the foot of [some bird, *gallinazo?*], and the crisp (*crespilla*). This difference proceeds from the lichens, which grow on the bark. The colour, which for the most part characterizes the cinchona barks, is clear grey, with scarcely any lichens. This colour is remarked on the young trees, on the tender branches, and on that sort of trees and young shrubs on which the lichens are not yet grown. The surface of the bark, which exhibits the seven specified appearances, is rough and horny, and is all received in trade; but, on the contrary, the others, which have none of these colours, are rejected from commerce, *although they may be from the same tree*, and have the other characteristic marks which this tree should possess."

Ruiz seems to think, however, that there is *something* to be learned by this mode of discrimination, and says, further, under the head outer coat, among the criteria of good bark—"The outer coat of good barks is, for the most part, rough and uneven; that of the middling sort is less rough; *and that of the most inferior is smooth*, more or less according to the scale of their diminished worth."

I quote this, not as confirming the remark, but in order to illustrate what I have written above.

tree, only that it gives way in cross cracks as well as laterally. I have never seen any quantity of this together, but only specimens intermingled with other barks.

Fifth sort.

The mammellated variety. No. 27, *C. cascarilla serrana de Huaranda, Loxa.* "Serrana" means growing in the mountains.

This bark is a kind of Jaen-looking bark, in coarse, twisted, white-brown quills, with a peculiar mammellated appearance, owing to some obscure warts. I have seen it imported singly as well as mixed with other kinds. Dr. Weddell has remarked the tree as a variety of C. ovata, of which he has a botanical specimen, and has favoured me with a portion of the bark, which agrees with this of Pavon.

Sixth sort.

The hard-coated variety. This is represented by No. 18 B. in the collection of the Pharmaceutical Society, called by Dr. Julius Martiny *Cortex chinæ pseudo-regius.* It is accounted by Dr. Weddell the produce of C. ovata, but has several very distinctive peculiarities. The internal portion of the bark is remarkably finely fibrous, but the outer half, on the contrary, has quite a hard structure, which breaks short, and abounds on the exterior with oval cavities filled with fungoid matter. When a large piece (the pieces are generally half quilled) is cut through with a fine saw, the outer portion is seen hard, and as if polished by section, whilst the inner part displays its peculiar fibrous structure. The younger branches are covered with a smooth, greenish-black epidermis, unlike any other sort that I have seen.

Seventh sort.

The fibrous variety. This is not found in the collection, it is M. Guibourt's *Q. blanc fibreux de Jaen*, and is the sort from which Mazzini drew his Cinchovatine. This appears to me to be the same alkaloid which in these papers I call *quinidia* —at least I am unable to detect any difference between them. I have examined this peculiar sort of C. ovata, and obtained from it quinidine in well-defined crystals.

No. 14. *Cinchona glandulifera.*

This is the *cascarilla negrilla* of Poeppig, which this author considers the finest sort found in the neighbourhood of Cuchero. In comparing a specimen gathered by this naturalist, and now in the collection of the Pharmaceutical Society, together with other specimens collected by M. Goudot, and now in the Museum at Paris, with the "H O" bark of British commerce described in a previous number, I have come to the conclusion that they are identical. The "prevalent black colour of the epidermis;" "the shining and almost resinous fracture;" "the colour of a ripe orange on the inner surface, shading off to a fiery brown;" All these characteristics mentioned by Poeppig agree with the new "crown" or "H O" bark mentioned above. Moreover, the arrangement of the cross rings and the general appearance of the outer coat in a piece of C. negrilla, in my possession, collected by Goudot, are exactly similar to pieces in the "crown" bark under notice. The taste, described by Weddell as "tolerably bitter, very styptic, and a little aromatic," also, I think, coincides.

Poeppig gives another variety, which he calls *cascarilla provinciana negrilla*, as the product of the same tree, grown under different circumstances. The chief difference seems to be that this last is a more wooly sort and of paler colour. This also is the case with some pieces in the new "crown" bark.

If the *cascarilla negrilla* is represented at all in Pavon's collection, it is, I think, under

No. 24. *C. quina crespilla parecida à la buena de Loxa.*

Of this Laubert remarks that "it is not known whether it is a species or a variety." The cross cracks form rings with remarkably everted edges, and in this particular respect it agrees with the *negrilla*, but it seems more hard and woody than is usual with the latter bark. It may be the *provinciana* variety; at all events I am unable to assign it to any other tree

No. 16. *C. Humboldtiana.*

Of this species (the C. villosa of Lambert) there are three botanical specimens, classed thus by Lambert, *a. C. villosa inedita; β. γ.* C. sp. nova de Jaen de Loxa, *son dos exemplares del numero 1°.* It is on the ground of this inscription that I bring No. 39 under this head.

No. 25. *C. quina con hojas un poco vellosas de los Azoques de Loxa (Azoques*, a hamlet so called near Loxa). Foliis *subvillosis*, according to Tafalla. This is called by M. Guibourt *Q. de Loxa jaune fibreux.* It is a peculiar Loxa bark covered with lichens, giving it a leprous character; most resembling the *Quina negra* in its general appearance.

No. 39. *C. sp. nova de Jaen de Loxa, es buena corteza.* Is a fibrous Loxa bark, moderately heavy, somewhat like *lancifolia.*

No. 27 on the wood is the same bark, and the coating seems to be that of an inferior Loxa bark.

Dr. Weddell says of C. Humboldtiana "crescit ad urbem *Jaen* in Peruvia septentrionali."

No. 18. *C. Mutisii.*

Var. *a. microphylla, C. quercifolia.* Pavon in Herb. Lambert.

No. 13. *C. con hojas de roble de Loxa* (oak-leaved). Foliis ovatis rugosis, minoribus. Tafalla, *var. β crispa.*

No. 9. *C. con hojas rugosas de Loxa.* Foliis ovatis, integerrimis rugosis. Tafalla.

These two specimens present us with the bark of the two varieties (the smaller and the larger leaved) of the species mentioned above. They are very much alike, and distinguished from all other cinchonæ by their *exceedingly fibrous* character, in which respect they surpass even the C. amygdalifolia of Weddell. The bark has a grey coating, and is often smooth for long distances. It separates laterally with great ease into long filaments.

The No. 9 is called in the Collection Delessert, from the shape of the leaves, *Cinchona parabolica*, and the botanical specimen of this (so named by Pavon) in Mr. Webb's collection, at Paris, shows it to be the *var. β crispa* of this species.

This very remarkable bark is the *Quinquina payama de Loxa*, described by M. Guibourt in his *Histoire des Drogues.* This M. G. asserts, and I can confirm it from inspection both of his specimens and those of Pavon.

No. 20. *Cinchona discolor.*

This, according to Weddell, is the source of the bark called *hoja de Oliva*, for remarks on which see under the head C. nitida.

Barks of uncertain origin.

The preceding are all the specimens in Pavon's collection which I can refer with any certainty to the genus cinchona, or at least to any definite species. The following I also suppose to belong to this genus, but have no satisfactory account to give of them.

No. 2. *C. cascarilla crespilla de Jaen de Loxa. Cinchona umbellulifera*, Pav. MSS.

No. 6. *C. cascarilla Puchon di Loxa.*

No. 11. *Quina crespilla de Loxa.*

No. 24. *C. quina crespilla parecida a la buena de Loxa.* Synonym "Quina carrasquena," according to Lindley, from MSS. of Ruiz.

No. 29. *C. cascarilla con hojas de Palton de Loxa.*

No. 31. *C. crespilla mala de Macos.*

I am inclined to think one or more of the above crespilla barks may (as I have before hinted) range under the head of C. glandulifera, but the authentic examples of C°. negrilla are too poor and vary too much among themselves to permit the full decision of the question.

(To be continued.)

ON THE SANSEVIERA GUINEENSIS, OR AFRICAN HEMP.

BY WILLIAM F. DANIELL, M.D., F.R.G.S.,
Assistant Staff Surgeon, &c.

THE maritime districts of Western Africa produce many important plants, highly appreciated by the native tribes, in consequence of the variety of useful purposes to which they can be adapted. But since the knowledge of their properties and appliances have hitherto been restricted to people whose barbarous condition renders them unacquainted with the scientific processes by which European communities enhance the value or develop the sphere of their utility, a brief introduction to the notice of more civilized nations as articles of commerce, might not be devoid of interest at the present time, since, by such information, speculations in these kinds of indigenous products may not unfrequently be attended by successful results. The exportation of various vegetable substances would likewise tend to promote and encourage the incipient commerce of the comparatively unknown regions of the African coasts, and to some extent become the means of reclaiming their populations from the degrading avocations they now pursue, by the induction of remunerative prices with a constant demand for these exports, as would subsequently lead to their more zealous cultivation, and hence amply repay the grower for the toil and trouble incurred.

The Sanseviera now claiming our consideration, belongs to a succulent genus of plants common to most of the arenose districts of tropical Africa, and which were first distinguished by Thunberg, the celebrated Swedish botanist and traveller, in his "*Prodromus plantarum Capensium*," by the name they at present retain. This particular species, however, appears to have been known in England from an early date, for Aiton remarks, that it was reared without difficulty in Hampton Court gardens so far back as 1690. The designation of African bow-string hemp, then bestowed upon it, was evidently derived from the uses to which the fibres were applied by the aborigines of those countries from which it was obtained, viz., in the manufacture of bow-strings of superior strength and durability to others, at that period in ordinary requisition amongst the negro warriors of Guinea, before the importation of fire-arms had become so general as to obviate the necessity of such weapons as bows and arrows.

The few varieties of the Sanseviera hitherto discovered in Western Africa, are, nevertheless, widely distributed throughout several of the maritime regions of the Gold Coast, Senegambia, and the Cape of Good Hope, where they abundantly flourish in the dry sandy loams of those localities thinly wooded, but covered more by detached thickets of brushwood, on the outskirts or under the shelter of which they chiefly delight to grow.

The modern Africans usually employ the exsiccated fibres of the plant in the construction of fishing-lines, nets, thread, and other kinds of cordage, considering them to be better capable of resisting the destructive action of continual immersions in sea-water, than other vegetable substances similarly prepared. Thonning, whose botanical researches in Akkrah and the neighbouring kingdoms have contributed so much to our knowledge of the Flora of the Gold Coast, has given a full description of this production in his "*Beskrivelse af Guineiske Planter*," with an account of its appliances by the inhabitants of these countries, the latter being unfortunately in the Danish language, and therefore not so readily understood. The subjoined botanical outline is taken from Kunth's *Enumeratio Plant.*, vol. v., p. 15.

SANSEVIERA. *Thunb.*, *Kunth.*—Perigonium corollaceum, tubulosum rectiusculum, usque ad medium 6-fidum, deciduum; laciniis subspathulato-linearibus obtusis, uninerviis, æqualibus patentissimis (reflexis, Gawl.). Stamina 6 fauci perigonii inserta, exserta, patula (patentissima, Gawl.). Filimenta filiformia. Antheræ biloculares, lineari-oblongæ, apice bilobæ, vasi bifidæ, dorso medio affixæ, introrsæ. Ovarium liberum sessile, oblongum, trigonum? (trilobum, Roxb.) triloculare; ovula in loculis solitaria, sessilia, adscendentia anatropa.

Columna stylina terminalis, filiformis, erecta, stamina superans. Stigma capitatum integrum. Baccæ 1—3, leviter unitæ, singulæ globosæ, carnosæ, monospermæ. Semen globosum. Embryo in basi albuminis ad latus exterius locatus. (Charact. fruct. et seminis ex Roxb.). *Plantæ acaules, perennantes, stoloniferæ.* Rhizoma crassum, repens (Gawl.). Folia radicalia, pluri vel bifaria lanceolata, crassa atque dura, carne fibrosa, sæpe fasciata, basi vaginantia. Scapus e centro foliorum prodiens, bracteatus simplex apice racemoso-multiflorus. Flores per 4—6 fasciculato-congesti bracteolati, viridulo-albi, vel viridulo-flavidi; pedicellis supra medium articulatis. *Perigonium basi in pedicellum attenuatum.* Distinguitur a Dracæna nonnisi stigmate capitato et habitu peculiari.

SANSEVIERA GUINEENSIS.

Class Hexandria Ord. Monogynia. Nat. Ord. Asparagineæ, *Kst.*

α. S. Guineensis, *Willd. Sp.* 2, 159 (*excel. synon. Thunb. monente, Gawl. Bot. Mag. t.* 1150) *Ej. herb*, n. 6711, *fol.* 1, *Bot. Mag. t.* 1179 (*excl. Salsola spicata Cav.* * * * *) *Ait. Kew ed.* 2, 278, *Haw. Syn.* 65, *Schult. Syst.* 7, 355. Foliis subtribus, suberectis, late lanceolato-ensiformibus viridibus, valde fasciatis, *Haw.* Aletris hyacinthoides, *β* guineensis, *Linn. Sp.* 456 (Aloe Guineensis radice geniculata, foliis e viridi et atro undulatum variegatis. *Comm. Hort.* 2, 39, *t.* 4, *Prael.* 84, *t.* 39). *Ait. Kew.* 1, 464, Aletris hyacinthoides, *Mill. Dict. ed.* 7, *n.* 22. Aletris Guineensis, *Jacq. Vind.* 1, *p.* 63, *t.* 84. *Lam. Encycl.* 1, 79. Aloe Guineensis *Jacq. Enum. stirp. Vind. app.* 308. Acyntha Guineensis, *Medic. Theod. Palat.* 76.

β. S. Guineensis. *Red. Lil. t.* 330. S. Thyrsiflora. *Thunb. Prod.* 65. *Ej. cap. ed. Schult.* 329. Salmia Guineensis. *Cav. Ic.* 3, 24 *in nota.*

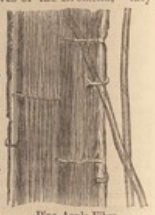
γ. S. Pumila *De Spin Jard. St. Sebast.* 28. Guinea. Rhizoma carnosum, crassum, articulatum, horizontale. Folia radicalia plurima, fasciculata, erecto-patentia, involuto-concava, coriacea, obtusa, rigida, nitida, epidermide, rugulosa, fasciis transversis, nudatis, dilutioribus cum intensioribus, alternantibus, in vetustioribus subconcoloribus mucrone cartilagineo ½-2 pedalia 2-3 poll. lata. Scapus 1½ pedalis. Racemus compositus, spicatim elongatus. Flores divergenti-erectinsculi, breviter pedicellati, bracteolis acuminatis interstincti et in faciculos pauciflores sessiles sparsos, parum remotos segregati virescenti-albi 1½ pollicares, vespere et noctu expansi, fragrantissimi. Perigonii tubus sulcato-teres basi tumidiusculus; laciniæ ligulatæ obtusiusculæ subæquales revolutæ longitudine tubi. Stamina subæqualia, tubo aduata, limbo breviora. Antheræ albæ. Columna stylina filiformis, filimentis duplo crassior, stamina et perigonium superans ovarium ovato-oblongum, obtuse trigonum trisulcatum. Bacca aurantiaco-rubra, depresso globosa abortu monosperma (Ex Gawl.). In *var. β* Folia radicalia 2-3 basi canaliculata, supra plana 22-38 pollicaria; 2½-4 poll. lata, atroviridia fasciis dilutioribus. Scapus 8-16 pollicaria, squamis membranaceis ovato-lanceolatis. Racemi flores geminati pedicellis 1-1½ lin. longis. Flores vix bipollicares. Antheræ citrinæ. Ovarium ovatum, sex-sulcatum. Stigma bilobum (Ex Redouté). In *var. γ.* Radix nodosa. Folia brevia, crassa recurva carinata, maculis obscure viridibus. Nondum floruit (Ex Spin.).

The natives of Akkrah term the hemp procured from this plant *Blaw*, and prepare it by the following simple process. With the view of obtaining fibrils of the length necessary for their purposes, the exterior, or largest leaves, are always selected in preference to the others; these in the first instance are well beaten between two stones, then placed in water or in holes dug out of the ground and closely covered over by moist soil for the space of three days. At the expiration of this period, when the mass has become fully softened, it is removed and subjected to another pounding, to dissever the fibrillous from the pulpy portions of the leaf, which are next thoroughly cleansed by ablutions of fresh water from the latter, and then dried in the sun. They are subsequently made up for sale in small bundles, containing each about a dozen lesser portions, twisted at one end, of a light brown hue, and seldom exceeding a foot in length.

Another kind of flax named *Annasse* is also manufactured by the same people

from the *Bromelia Ananas*, but by a somewhat different method. The leaves are stretched on a flat piece of wood, and the surfaces sufficiently scraped to expose and divest their longitudinal filaments from the pulpy matter in which they are embedded; they are then repeatedly washed, and afterwards exposed to bleach in the sun. The fibres thus procured are of a beautiful white colour, and much longer than those of the *Blanc*.

Emmo is a third sort, obtained from the trailing stem of a species of convolvulus or creeper, in a similar manner as the pine-apple flax, with which it is conjoined in the formation of the mesh-work of their fishing nets; the edge ropes being more exclusively composed of the *Blanc*. *Annanze* is likewise used to manufacture the native thread or twine, resorted to equally for sewing as stringing beads,—although they have another kind of twine made from the sheaths of some gramineous product for the latter object. Adanson has remarked that the negroes of Senegal make very good ropes, fishing lines, and nets, not so apt to rot in the water, from the Guinea aloe*, which is doubtless the same species of Sanseviera as that of Akkrah, as is also the flag or grass mentioned by Winterbottom that the Timmanes and Bulloms designate *Ipperbeh*, and employ as a substitute for hemp. Like the leaves of the *Bromelia*, "they are laid upon a board and scraped with a thin piece of wood until freed from the pulp and then dried in the sun. The nets made from this are neither so strong nor so durable as those made from the palm leaves, but they are much easier prepared."†



Pine-Apple Fibre.

The following observations on the structure of the woody fibres of the Sanseviera and Pine-apple have been kindly communicated to me by my friend Professor Quekett:—

"The woody tissue of the pine-apple, as imported, consists of bundles of various sizes, measuring from two to three feet in length, all of which, by careful manipulation with needles, are capable of being separated into smooth fibres on an average $\frac{1}{1200}$ of an inch in diameter; these are of cylindrical figure, and to all appearance perfectly solid. The fibres of the Sanseviera on the contrary are shorter and generally more or less flattened, and of a brown colour; they occur in bundles of various sizes, each having some of the ultimate woody fibres projecting from their sides. When treated with needles in the same way as the pine-apple, the ultimate fibres are obtained; these are always more or less flattened, and present a somewhat granular appearance; they vary much in size, some being as large as the $\frac{1}{1200}$th of an inch, whilst others may now and then be met with as small as $\frac{1}{2000}$, but these are rare. Most of the fibres exhibit a linear marking in the centre, they are very strong, but not so smooth or cylindrical as those of the pine-apple, even the most minute ones being more or less flattened. The diagrams represent the size of the bundles of the woody fibre in the two plants, as also the ultimate fibres into which they can be separated; the magnifying power employed being the same in both cases. It will be noticed that each bundle has on its exterior a fibre of large size."

Sanseviera.

* *Voyage to Senegal. By Adanson. Engl. Trans.* p. 201-2.
† *An Account of the Native Africans*, vol. i., p. 94.

EXTRACTUM SCILLÆ ACETICUM.

BY MR. F. D. NIBLETT.

HAVING had frequent complaints from Medical men as to their "inability to preserve the *Pulv. Scillæ* any length of time in a fit state for dispensing," I was induced to turn my attention to the preparation of an article that should supply its place, and be at all times readily dispensed. I have done so in the shape of an *Acetic Extract*, and having introduced it to several gentlemen, who have all spoken highly of it, as possessing all the characteristics of, and decidedly preferable to, the *powder*, with which they have hitherto had so much trouble, I have ventured to forward you the *modus operandi*:

EXTRACTUM SCILLÆ ACETICUM.

℞ Rad. Scillæ ℔j.
Acid. Acetic. f ℥iij.
Aq. Destil. Oj.

Digest with a gentle heat for forty-eight hours, express by strong pressure, and *without* straining evaporate to a proper consistence. One grain is about equal to three of the powder.

Church Street, Hackney.

ON THE MANUFACTURE OF WRITING INKS.

(*Concluded from page* 71.)

Indelible Carbon Ink.—In order to prepare an indelible writing ink, incapable of being effaced by ordinary re-agents, Dr. Lewis suggested a union of the ancient with the modern method, by adding a small portion of a carbonaceous matter, such as lamp-black, &c., blended with a thick mucilage of gum arabic, to ordinary writing-ink. This suggestion has been followed out by various experimenters, some of whose processes we will now proceed to notice.

Dr. Normandy's Indelible Writing Ink.—To form what he terms a really indelible writing ink, which cannot be defaced or obliterated by any known chemical agent, Dr. Normandy gives the following formula: twenty-four pounds of Frankfort lamp-black must be first ground with mucilage (formed by adding twenty pounds of gum to sixty gallons of water), and the mixture filtered through a very coarse flannel, or through a funnel the spout of which is stopped by a sponge; four pounds of oxalic acid are then added, together with as much decoction of cochineal and sulphate of indigo as will give the shade of colour desired.

Dr. Traill's Indelible Writing Fluid.—Dr. Traill, Professor of Medical Jurisprudence in the University of Edinburgh, has suggested the following mode of preparing an indelible writing ink, which, by resisting chemical deletion, diminishes the chances of the successful falsification of bills, deeds, and other documents. Dr. Traill was led to the investigation of this subject by its connection with that branch of medical jurisprudence which treats of the prevention and detection of forgery.

It is well known that common writing ink may be totally effaced from paper, by certain chemical agents, and that several others so impair its colour, that the characters traced with it become illegible. To the first class of chemical agents belong chlorine, and the substances containing it, as well as oxalic acid; to the second, diluted solutions, or the vapours of the mineral acids, and of the caustic alkalies. These agents were applied to written specimens of a great number of different inks, and the degree of resistance to their effects was considered as the criterion of the durability of each.

These views engaged Dr. Traill in an extensive series of experiments on coloured metallic preparations, suspended in different vehicles, the results of which were not satisfactory. He then attempted the composition of a carbonaceous liquid, which should possess the qualities of good writing ink. The inks used by the ancients were carbonaceous, and have admirably resisted the effects of time; but Dr. Traill found that the specimens of writing, on the Herculaneum and Egyptian papyri, were effaced by washing with water; and on forming inks after the descriptions of Vitruvius, Dioscorides, and Pliny, he found that they did not flow freely from the pen, and did not resist water. The carbonaceous inks, with resinous vehicles,

rendered fluid by essential oils, though they resisted water and chemical agents, had the disadvantage of not flowing freely from the pen, and of spreading on the paper, so as to produce unseemly lines. Solution of caoutchouc in coal-naphtha, and in a fragrant essential oil, imported from South America, under the name of *aceite de sassafras*, the natural produce of a supposed Laurus, were subject to the same objections.

Dr. Traill tried various animal and vegetable fluids as vehicles of the carbon, without obtaining the desired result, until he found in a *solution of the gluten of wheat in pyroligneous acid* a fluid capable of readily uniting with carbon into an ink, possessing the qualities of a good, durable writing ink.

To prepare this ink, he directs gluten of wheat to be separated from the starch as completely as possible, by the usual process, and when recent, to be dissolved in pyroligneous acid, with the aid of heat. This forms a saponaceous fluid, which is to be tempered with water, until the acid has the usual strength of vinegar. He grinds each ounce of this fluid with from eight to ten grains of the best lamp black, and one-and-a-half grain of indigo. The advantages of this ink are :—1. It is formed of cheap materials ; 2. Is easily made ; 3. Has a good colour ; 4. Flows freely from the pen ; 5. Dries quickly ; 6. When dry is not removable by friction ; 7. Is not affected by soaking in water. Lastly, slips of paper written on by this ink have remained immersed in solutions of various chemical agents, capable of immediately effacing or impairing common ink, for seventy-two hours, without change, unless the solutions be so concentrated as to injure the texture of the paper.

This ink is especially useful for the drawing out of bills, deeds, wills, or wherever it is important to prevent the alteration of sums or signatures, as well as for handing down to posterity public records in a less perishable material than common ink.

Stephens' Carbon Ink.—In order to combine carbonaceous matters with other colours, so as to form a writing fluid, or ink, which cannot be decomposed by chemical agents, Mr. Stephens dissolves resinous substances in solutions of alkali or alkaline salts, by means of heat ; and adds to this, fine lamp-black, or other carbonaceous matter. His process is as follows :

Take common carbonated alkali, or the potash or soda of commerce, or ammonia, or some of the other alkaline salts, which will answer the purpose, and mix it with a resinous matter, such as shellac or rosin, about equal parts, by weight, of each ; then add water, according to the required strength of the solution, and boil these until the resinous matter, or a great portion of it, has become dissolved. Then mix in a mortar the necessary quantity of fine lamp-black, with this solution, and thereby produce a black liquid, which may then be mixed with other suitable coloured solutions, to form an indelible ink ; such colouring matter as is soluble in alkali will mix best with this composition.

Costhupe's Indelible Ink.—Mr. C. T. Costhupe gives a formula for an ink that resists the action of acids, alkalies, water, or any of those substances usually employed for defacing writings :—Take shell lac 2 ozs.; borax 1 oz.; distilled or rain water 18 ozs. Boil the whole in a losely covered tin vessel, stirring it occasionally with a glass rod or a small stick until the mixture has become homogeneous ; filter, when cold, through a single sheet of blotting paper ; mix the filtered solution, which will be about nineteen fluid ounces, with one ounce of mucilage of gum arabic, prepared by dissolving one ounce of gum in two ounces of water, and add pulverized indigo and lamp-black *ad libitum*. Boil the whole again in a covered vessel, and stir the fluid well to effect the complete solution and admixture of the gum arabic ; stir it occasionally while it is cooling; and after it has remained undisturbed for two or three hours, that the excess of indigo and lamp black may subside, bottle it for use. This ink for documentary purposes is invaluable, being, under ordinary circumstances, indestructible ; it is also well adapted for the use of the laboratory.

Berzelius' Indelible Ink.—The following account is given by Berzelius of an almost indelible ink, applicable to all common purposes, which he has prepared from the metal vanadium. The vanadate of ammonia, formed by the combination of vanadic acid with ammonia, when mixed with infusion of galls, forms a black liquid, which is the best writing ink that can be used. The quantity of salt necessary for a perfectly black ink is so small, that it will not be worth considering when vanadium is more generally known. The writing obtained with this ink is perfectly black. Acids render it blue, but do not obliterate it like common writing ink ; the alkalies, when sufficiently diluted not to act upon the paper, do not dissolve it ; and chlorine,

which destroys the black colour, does not, however, efface the writing, even when water is afterwards suffered to run over it. In a word, if this ink be not perfectly indelible, it strongly resists reagents which instantly cause common ink to disappear; added to which it is blacker and flows better, because it consists of a solution, and not of a precipitate suspended in a solution of gum. It remains to be proved what the effects of time will be upon it.

Whitfield's Indelible Safety Ink.—Mr. Whitfield's process for manufacturing indelible safety and durable black fluid writing ink, as patented by him in 1837, is as follows :—Take four gallons of linseed oil, two gallons of cocoa-nut oil, and one pound of solution of Indian rubber, one gallon of the very best molasses or treacle, five pounds of loaf sugar, one pound of parchment shavings, one pound of powdered seed lac, two pounds of ground oacre seed, two pounds of ground cotton seed, two pounds of Venice turpentine, four pounds of very fine pulverized charcoal, two pounds of ivory black, two pounds of the best Antwerp black, four pounds of dried bullock's blood, two pounds of finely powdered burnt horns, two pounds of tartar, one pound of Indian borax, one pound of cyanuret of potash, three pounds of Aleppo galls finely powdered, three pounds of powdered pomegranate peel, two pounds of finely powdered gum kino, two pounds of Anacardium nuts, three pounds of the very best powdered glue, three pounds of finely powdered walnut skins, and four pounds of finely powdered gum arabic. Mix the above ingredients in a large iron boiler and boil them, at which time the mixture is to be set on fire with a red-hot bar of iron, and the smoke arising therefrom is to be received into a large inverted cone made of the best sheet iron. As soon as the whole of the oil is consumed, the carbon that adheres to the inside of the cone is to be collected and put into jars. The residue in the iron pot is to be taken out and rubbed down to a very fine powder on a stone slab. Then take one pound of the prepared carbon obtained by the smoke on the cone, and one pound of the residuum above-mentioned, add one quart of the very best French vinegar, two gallons of hot water, and a quarter of a pound of gum lac, and boil the same for ten minutes in a large iron pot. Then add one pound of Aleppo galls finely powdered, and two pounds of logwood chips. Stir the whole well together until cold, and put the liquor into large flat pans, and expose it to the atmosphere for three weeks.

The indelible writing ink approved by the Paris Academy of Sciences is formed by adding Indian ink to dilute hydrochloric acid for quill pen use, and to weak solution of caustic potash for steel pen use.

Moody's Continuously Supplying Inkstand.—In 1820, Mr. Moody, of Margate, brought out an inkstand, which, being lined with a solid dry ink, furnished, on the addition of water, a continuous supply of writing ink. For this purpose, an outer case of an inkstand is made of metal of any form, in which is placed a vessel of glass or lead, intended to contain the carbonaceous and extractive matter or dry ink. This inner vessel is fixed by pouring round it, and filling up the case with, a cement made of melted sulphur, mixed with lamp-black or any other colouring substance.

The ingredients of which the dry ink is compounded, consist of half a pound of honey, and the yolk of an egg, with 1 oz. of extract of logwood, mixed up in a mortar ; then ½ oz. of strong extract of galls is added, and the whole allowed to remain six days, often stirring the compound ; it is then to be strained, filtered, and the aqueous parts evaporated, when 3 ozs. of gum arabic, and 1 oz. of white sugar-candy, in a solution of salt or soft water is to be added, with 1 oz. of indigo, 3 ozs. of lamp-black, and 2 ozs. of decoction of logwood ; these are suffered to remain several days, after which 1 oz. of dry blue galls, 1 oz. of indigo, and 1 oz. of willow charcoal are to be introduced. The water is then evaporated, and the composition, in the state of paste, put into the glass or leaden inkstand, and covered with cotton soaked in vinegar and salt, to which, whenever it is required for use, water must be added.

Smith and Dolier's Delible Ink and Copy Book.—In 1831, Messrs. Smith and Dolier, of Liverpool, took out a patent for the manufacture of a "delible" writing ink, and for a prepared surface on which to write or draw with this ink. Thus, any copy in writing, or sum in arithmetic, any map in geography, or subject in drawing, may be repeated again and again on the one page of this prepared copy-book, and by means of a sponge rubbed out as often as required.

The delible ink is thus made :—take 1 gallon of water, with 1 pint of it mix 1lb of gum arabic, melt it over a slow fire, add gradually from the gallon of water. If the ink is to be black, pour into the gum mucilage 4 ozs. of fine lamp-black, and

mix it well by rubbing it between the hands; if any other colour be preferred, any water-colour may supply the place of lamp-black.

The prepared surface of the copy-book is thus manufactured:—Take a piece of fine linen and stick it on a frame, and rub it with pumice stone till every unevenness of surface is removed. Then make a priming of 14lb of single size of the best and cleanest kind, 1lb of whitening, and $\frac{1}{2}$lb of linseed oil; let this be carefully mixed and applied equally over the linen, and when the first coat is dry, rub over with pumice stone, and give another coat, rub down again and again, and repeat the sizing. When this is quite dry, take white lead, Paris white, and linseed oil, mixed to the consistence of molasses, and lay it on with a trowel over the sized linen prepared as above described. Give it time, three days to dry, and repeat this coating also, concluding, however, with fine white lead and turpentine, to produce a dead ground. Care must be taken to let each coating dry regularly and spread equally, and be sure that the surface is scrupulously rubbed down and made quite smooth. The linen may then be cut into the right shape and size, and the pages, if more than one, bound in mill-board. The copy-book is then complete.

Dunkin's Copying Ink.—In 1835 Thomas Dunkin, of Bordeaux, patented the following method of preparing a copying ink and taking copies of manuscripts, &c.

The manuscript writing or drawing is first produced by a pen with a prepared ink, made as the ordinary writing ink, such as 200 parts of water, fifteen parts of gall-nut, fifteen parts of sulphate of iron, ten parts of common sugar, twelve parts of gum Arabic. To eighteen parts in weight of this ordinary ink add six-and-a-quarter parts of sugar-candy, two-and-a-half parts of deliquescent salt, such as marine salt, muriate of lime, &c.

Having written a page, or produced a drawing on a sheet of paper, or other material with this prepared ink, place it on a waterproof varnished or polished oiled silk or skin; or other proper surface, laid on the bed-board of the press, the writing or drawing being placed next, or in contact with the smooth surface of the said oiled silk or skin, a double cloth, or a smooth cardboard, is then to be placed on them, and the whole passed through the press behind the rollers, by which the writing or drawing will be transferred from the paper on to the oiled skin or silk, or other smooth surface in reverse. An impalpable powder, intended to form the ink for making the duplicate copy or impression, and composed of colouring ingredients according to the colour desired, is then passed over the oiled skin or silk, or transferring surface. For example: for black line writing or drawing the powder may be composed of sulphate of iron, or the acetate of iron, gall-nuts or gallic acid, sugar-candy, and lamp black, the portions being varied according to the intenseness of the colour or the number of duplicate copies wished to be obtained. For example: one part lamp-black, twenty-seven parts sulphate of iron, thirteen parts gall-nuts, sixty parts of powdered sugar-candy will make an ink-powder capable of obtaining several copies of ordinary writing. The powder being passed over the transferred writing or drawing adheres to it, and with a light long-haired brush the oil-skin is swept gently to take off the superfluous powder, or that which does not stick on with the transfer. The powdered lines or transfer is then dampened by breathing over the whole surface of the oilskin until the lines appear black and are damp; or the same effect may be produced with more regularity by using damped linen stretched over a board, or on a sheet of metal with the edges turned up, and slightly wetted with a sponge, such plate or linen being placed over the oilskin or silk or transferring surface, the edges of the plate of metal or board preventing its touching the surface of the transfer, but allowing the powder to take the dampness thrown out by the linen or metal plate. When the transfer is sufficiently damp, the paper intended to take the duplicate copy is placed in contact with it, and they are passed through the press, for a second copy, and so on, repeating the system each time, according to the number required, or that which the transfer will give. Afterwards wash the varnished oil-skin, or transferring surface, with a wet sponge, and it is ready to take another transfer.

Mackenzie's Colourless Writing Ink.—In 1844 Sir George Mackenzie took out a patent for an invention, the objects of which were, firstly, to substitute for the common black and blue inks a transparent, and as much as practicable a colourless and innocuous fluid, which being used with suitably prepared paper, will produce either

black or blue characters; and, secondly, to produce a black ink, which when written with on paper or other material suitably prepared, will flow readily from the pen, and be indelible, and from which copies may be taken, if required, on copying-paper, prepared for the purpose.

In the first place a dry powder is prepared, consisting of, first, gall-nuts in their natural state, or salts prepared from them, or from other substances containing tannin, by treating galls, or such other substances, with water, common spirits, alcohol, ether, vinegar, pyroligneous acid, or other means;—second, anhydrous ferro-cyanide of potassium;—third, carbonate of lime, or anhydrous carbonate of soda;—fourth, rice flour. The proportions of these articles, and the number of them employed, admit of variation according to the varying qualities of the gall-nuts.

The proportions that have been found suitable for producing dark writing, are three parts by weight of powder of gall-nuts, one part anhydrous ferro-cyanide of potassium, one part carbonate of lime, and three parts rice flour; for blue writing, one part anhydrous ferro-cyanide of potassium, and six or seven parts rice flour; the blue tint may be varied, by the addition of a small quantity of gall-nut powder. These powders are pressed into the paper after it has been sized, and before it is finished; in the case of hand-made paper, the powder is pressed in by hand, assisted by a brush to remove the superfluous portions, or by a small machine; and it is applied to machine-made paper, by the use of suitable machinery. Parchment is prepared in the same manner by hand, to be written on with the black indelible ink.

The clear fluid used as ink with the prepared paper is made of permuriate of iron, diluted with a large proportion of water; other per-salts may be used.

Mackenzie's Copying Ink.—The black indelible ink may be prepared in two ways, either by rubbing down Indian ink in a pretty strong solution of per-muriate of iron in water, or by making a stiff paste of the finest lamp-black, prepared from bones, with strong mucilage of gum arabic, and diluting this paste with a strong solution of per-muriate of iron in water—one measure of per-muriate of iron to seven of water. Copies may be taken, on prepared copying-paper, of anything which has been written with this ink.

Carmine Red Ink.—Pure carmine 12 grains, solution of ammonia 3 ozs. Place the carmine in a porcelain vessel; pour thereon the solution of ammonia; heat over a spirit-lamp for a space of five to eight minutes, carefully managing the temperature so as not to boil; and to the solution thus formed add, continually stirring, powdered gum arabic, 18 grains. When dissolved the ink is ready for use. After using, the inkstand must be well closed. Instead of using carmine, which is expensive, drop lake (being a mixture of carmine precipitated with alum) may be employed, since the ammonia redissolves the carmine therefrom and leaves the alumina.

Manifold Writers.—For these no ink is required, the writing being effected by the application of a style formed of ivory, agate, steel, or other hard substance, to the surface of oiled paper, beneath which is laid the paper to be written upon, which latter is placed on a sheet of carbonated paper. The oiled paper is simply a very thin paper which has been imbued with any oil which is not readily oxidized or evaporated by heat. The carbonated paper is prepared by mixing finely levigated lamp-black or Prussian blue with oil, and evenly spreading the same on the surfaces of thin paper, which is then placed for five or six weeks between sheets of absorbent blotting paper, after which it is ready for use. The above process was patented by Wedgewood in 1806.

It may be stated, that as a general rule, writing inks containing logwood do not flow readily from the pen. A solution of creosote in rectified spirit of wine or pyroligneous acid is the best preservative of ink from mouldiness.

PREPARATION OF PURE FATTY ACIDS FOR THE MANUFACTURE OF CANDLES BY THE DISTILLATION OF COMMON FATS.

At the last Conversazione, held at the house of the Pharmaceutical Society, a series of specimens were exhibited illustrating the process adopted at the works of Price's Patent Candle Company for obtaining a white and hard fatty substance, suitable for the manufacture of the best description of candles by distillation from palm oil and other cheap fats. The following description of the details of the process is given in the "Reports of the Juries" of the Great Exhibition.

Sulphuric Saponification.—About twenty tons of fat, say palm oil, are placed in a

large lead-lined vat, and fused by a steam jet. The fluid mass, after being allowed to settle, has now to be exposed to the combined action of concentrated sulphuric acid and heat, and for this purpose is pumped up into the acidifying vessel, in which its temperature is raised to 177° Cent. (350° Fah.). The means of heating is a jet of low-pressure steam, which, in its course from the boiler, passes through a series of iron pipes heated in a furnace. The quantity of acid used is in the proportion of 6 lbs. for 112 lbs. of palm-oil. In this operation the palm-oil is decomposed and becomes much blackened. Withdrawn at that period it is seen that an important change has been effected by the action of the acid, as the mass now readily crystallizes to a tolerably solid fat. The fat is now drawn off from the acid and transferred to the washing-tank, where it is boiled up with water by means of a steam-jet.

Distillation.—After one or two washings the blackened fat is withdrawn and pumped up to the supply-tank, which commands the stills. The stills, which are made of copper, are heated by an open grate; each still is capable of holding five tons of fat. When charged, the temperature is raised to 293.5° Cent. (560° F.), and low-pressure steam passed through the mass. This steam is previously heated by passing through a system of iron pipes placed in a furnace.

The current of steam carries with it the vapour of the fatty acids, and thus facilitates the process. The mixed vapours of fatty acids and water pass together to a series of vertical pipes, which retain a temperature above 100° Cent. (212° F.), where the fats only condense while the steam passes to a second refrigerator, cooled by a current of water; here it is condensed along with the minute quantity of fat carried over by it. A separating tank, from which the water escapes at the bottom, whilst the fats float on the top, serves to recover this small quantity.

Distillation of the Residue.—After continuing the distillation for a certain period, the residue in the still is transferred to another still, formed of iron pipes, set in a furnace, and there submitted to a much higher temperature, and a jet of steam more strongly heated. The residue left in these iron stills is a sort of pitch, and is applied to the same uses as ordinary pitch. By this means an additional quantity of fatty acids is obtained.

The fatty acids, as they run from the still, are used to a great extent for the manufacture of candles, without pressing, and form what are called *composite candles*, which possess all the advantages of being self-snuffing, but are more fusible and softer than the pressed stearic acid candles.

A large proportion of the distilled fats, however, is pressed, to make a better sort of candle, and for this purpose fifty hydraulic presses are employed.

Cold-Pressing.—The fats are spread by ingenious machinery on woven mats, and submitted to powerful cold-pressure between iron plates; the oleic, or metoleic acid runs out, and is collected, and chiefly exported to Germany, where it is employed in soap-making.

Hot-Pressing.—After cold-pressing, the fat acids are subjected to hot pressure in hydraulic presses, confined in a chamber heated by steam. The pressed cakes, after the removal of the edges, are melted in contact with a little diluted sulphuric acid, and run into blocks. When the reporters visited the works the Company were distilling at the rate of 130 tons of palm-oil per week.

Pressed cocoa-nut oil is largely employed to mix with the pressed acids of palm-oil to make the best composite candles.

Price's Candle Company is the most colossal establishment in the world in this branch of chemical manufacture; possessed of five distinct manufactories, besides plantations of cocoa-nut trees in Ceylon, of a capital but little short of half a million sterling, and employing, notwithstanding the best arrangements for economising labour, 800 workpeople. It is not surprising that they divide annually in profits between £40,000 and £50,000.

PREPARATION OF FATTY ACIDS FOR THE MANUFACTURE OF CANDLES BY THE LIME PROCESS.

Saponification.—Into a large wooden vat, containing a coil of steam-pipe, pierced with small holes, ten tons of tallow are placed, with a quantity of water. The steam, when turned on, issues through the holes into the water, raises its temperature, and melts the tallow. As soon as the water has entered into brisk ebullition, a quantity of lime, in the state of thin cream, is added, and the ebullition continued

for six hours, or until complete saponification is effected. From ten to fifteen parts of dry quick-lime are added for every 100 parts of tallow. The lime decomposes the tallow and combines with the resulting stearic, margaric, and oleic acids, forming a lime soap (rock-soap), and sets the oxide of glyceryl at liberty in its hydrated state as glycerin, which dissolves in the water. The whole is allowed to cool in the vessel in which the boiling is effected, and the solution of glycerin run off.*

The rock-soap, when cold, is reduced to a coarse powder by a mill, consisting of a pair of fluted rollers, over which an axis is placed, carrying tiger-like claws, which revolve between a series of horizontal prongs. The claws, by passing between the prongs, tear the large lumps into small pieces, which are then crushed by the fluted rollers.

Decomposition of the Lime-Soap by Acid.—The ground lime-soap is now placed in lead-lined vats, supplied with a perforated copper steam-coil, each vat being capable of holding from eight to ten tons. When the temperature has reached the boiling point, sulphuric acid, previously diluted, is added in the proportion of about twenty-five parts to every 100 parts of tallow employed. The sulphuric acid combines with the lime, and liberates the oily acids, which float at the top, and are then termed "*yellow matter.*" This yellow matter is run off by cocks, placed at the proper level, into large spouted vessels called "jacks," and poured from these into flat tin moulds, in which it is allowed to cool and crystallize.

The sulphate of lime, after being well washed with boiling acidulated water, to remove the adhering fat, is sold as manure.

Pressing the Fatty Acids to remove the Oleic Acid.—The cakes of yellow matter are interleaved with cocoa-nut mats (without being sliced and enclosed in bags, as was formerly the case), and subjected between iron plates to a pressure of 600 tons in a vertical hydraulic press. A great portion of the oleic acid is thus removed, and the mixture of stearic and margaric acids rendered much whiter.

Refining.—The cold-pressed acids are then melted by steam in a lead-lined wooden vat, with a little dilute sulphuric acid, to remove any oxide of iron or other impurity; poured into flat tin trays, and again allowed to cool and crystallize.

Hot-Pressing.—The cakes of stearic acid, when cold, are put separately into a linen bag, interleaved with cocoa-nut matting and iron plates previously heated by steam, placed in the trough of a horizontal hydraulic press, which is likewise heated by steam, and then subjected to great pressure for some time. By this operation the remainder of the oleic acid, holding a little of the solid acid in solution, is removed. The pressed cakes retain a small quantity of oleic acid at the edges; these are scraped off, melted, and again pressed.

Second Refining.—This process is simply a repetition of the first process of refining.

The fusing point of the solid fats thus prepared is about 131° Fah.—*Reports of the Juries of the Great Exhibition.*

PROTEAN STONE, OR ARTIFICIAL IVORY.

This composition has been recently applied to the manufacture of a variety of objects, such as door-handles, finger-plates, inkstands, letter-weights, &c., which are made to resemble ivory, granite, and different kinds of marble. It is hard, may be made translucent, takes a high polish, and is applicable to many purposes for which ivory and marble are now used.

In the Reports of the Juries of the Great Exhibition, the following description of it is given:—

In order to illustrate this very ingenious manufacture, we must recal to the recollection of the reader the very familiar phenomenon of the solidification of a mixture of plaster of Paris (de-hydrated sulphate of lime) and water, which arises from the circumstance that the *anhydrous* sulphate of lime recombines with water equivalent in quantity to that of which gypsum is deprived by heat in the formation of plaster; but, as under the conditions of this solidification the plaster is diluted with far more

* Until within the last four years the glycerin was a valueless product; its utilisation is due to Mr. Thomas De la Rue, who, being engaged in experiments on its application in the arts, happened to observe its property of alleviating any irritation of the skin, and suggested to a medical friend its use in the treatment of cutaneous affections.

water than it can recombine with, it results that a portion must be left in a free state in the interstices of the mass, which is consequently opaque, and on drying becomes porous, and although it is the same in chemical composition, it differs greatly in its physical aspect and properties from the native compound, gypsum or alabaster, which is crystalline and translucent.

In reflecting on the cause of this difference, it occurred to Mr. Cheverton, that if the combination of water and anhydrous sulphate of lime could be slowly effected, whilst the latter was in a state of compression, an artificial stone might be produced, compact and crystalline in texture, and translucent in appearance. This view was fully confirmed by a series of experiments.

The process by which these results are obtained, is described in the specification of Mr. Cheverton's patent, obtained in June, 1850, as consisting in the de-hydration and subsequent re-hydration of native bi-hydrated sulphate of lime, either in a compact form as alabaster, or in the state of a fine powder. In the first instance, the alabaster is wrought into the required form ; and in the second, the material, in the state of a very fine powder, is compressed into a mould of the proper shape.

In either case, after the object has been fashioned, it is exposed for forty-eight hours to a temperature of from 250° to 350° Fah., by which means the water originally combined with the sulphate of lime is driven off. The substance thus becomes very friable, but still retains the form into which it has been wrought. Sometimes plaster of Paris itself is compressed into moulds ; but the article so formed is still subjected to the operation just described, notwithstanding the previous baking of the gypsum.

If a translucent appearance is required to be given to the surface of the figure, it is, before re-hydration, immersed into "white hard varnish," olive oil, or other oleaginous matter, until the surface is saturated ; but if an opaque surface is desired, then this operation is omitted.

To effect the hardening, the object is plunged, *for an instant only*, into water, heated to a temperature of from 100° to 150° Fah. This operation is repeated at intervals of from ten to fifteen minutes, until the sulphate of lime is completely saturated. The mass then becomes crystalline, and much harder than alabaster ; a circumstance which induces a belief that the new substance contains a quantity of water, in combination different from that in the native body ; or, in other words, that it is a new hydrate of sulphate of lime. The success of this part of the process depends in a great measure on the very gradual manner in which the combination with water is managed, for without due care the material decrepitates, and the article is then destroyed.

The colouring is effected by dissolving the requisite colours in water, and either sprinkling the object here and there with the coloured solution, so as to produce a mottled appearance, or else by immersing it altogether in the dye, which produces an uniform stain. This operation is performed previous to that of dipping in oil or varnish.

PAPER FOR BANKERS' CHEQUES, &c.

COPY OF THE SPECIFICATION OF THE PATENT

GRANTED TO HENRY GLYNN, *of Bruton Street, Berkeley Square, Gentleman, and* RUDOLPH APPEL, *of Gerrard Street, Soho, Anastatic Printer, for* IMPROVEMENTS *in the* MANUFACTURE *or Treatment of* PAPER *or Fabrics, to prevent copies or impressions being taken of any writing or printing thereon. Date of Patent, August* 14, 1851. *Date of Enrolment, February* 14, 1852.

IT is well known that by means of recent discoveries, a fac-simile of any original printed document, however elaborately engraved or designed, can be produced even to the most minute private mark, in a very short time, from the paper impression itself, and any person moderately acquainted with lithographic or zincographic printing, can without difficulty obtain what number of exact copies of an original he pleases, without the aid of an artist or engraver. Every description of printed document, paper money, or security for money issued to the public, on any kind of written or printed paper hitherto known, is consequently liable to be reproduced with the greatest facility.

NOW, our invention consists in so manufacturing or treating paper, as to prevent a transfer or reproduction of any document, bank-note, bond, bill of exchange, cheque,

engraving, writing, lithograph, or other document or print, being made by a transferring process, and thus we give protection to the property of bankers and others. For this purpose, we cause paper or fabric to be used for such purposes, to be combined or impregnated with materials which shall prevent a transfer being made. And the principle on which we act is this, that the materials with which the paper or fabric is combined or impregnated, shall either be acted on chemically by the surface, or materials used to produce a transfer, or shall impart to the paper or fabric such a protective quality as shall prevent a successful transfer, and we believe the following to be the best means of carrying out our invention.

We take a solution of a salt of copper (we prefer nitrate or sulphate) which is to be mixed with the pulp of which paper is to be made ; an alkali or alkaline salt is then applied in order to produce a cupreous precipitate (either hydrated oxide of copper or a salt of copper) insoluble in water (we prefer phosphate of soda) until reddened litmus paper turns blue. One ounce of nitrate of copper, or its equivalent of sulphate of copper, is sufficient to saturate for the purpose of our invention, two gallons of pulp, and less may be used if the colour is found objectionable. The pulp is then to be carefully washed with water. We mix with an alkali as much fixed oil (not a drying oil) as the alkali will convert into soap, and heat it until thoroughly melted, and while in a state of ebullition, we add old palm oil, and heat till thoroughly incorporated ; or we use a mixture of equal parts of white soft soap and old palm oil. We prefer this latter process. We dissolve the same in boiling water, using half a pound of the soap to one gallon of water, and into the saponaceous solution we dip the paper impregnated with copper in the pulp, as before mentioned. The paper is then to be sized in the ordinary manner, or the size without alum may be mixed with the soap solution, prior to the paper which has been made from the pulp impregnated with copper being immersed in it ; or the soap solution may be combined with the pulp when the same has been impregnated with copper as above mentioned, care being taken to get rid of the acid (if any). When the destruction of the original document is not desired, and when it is only sought to prevent a transfer being taken, the soap solution may be used alone, without the copper hereinbefore described ; that is to say, it may be dipped in it, and afterwards sized, or it may be mixed in the size without alum.

For the purpose of treating paper or fabric so as to prevent a transfer being taken, we wash or otherwise impregnate it with a saturated solution of sulphate of copper, or its equivalent of nitrate or other soluble salt of copper. When dry, the paper or fabric must be dipped in a solution of alkali or alkaline salt (we prefer phosphate of soda) sufficiently strong to convert the soluble salt of copper into an insoluble one. The paper or fabric must then be carefully washed in water, dried, and then dipped in the soap solution as hereinbefore described.

Having thus described the nature of our invention, and the manner of performing the same, we would have it understood that we do not confine ourselves to the salts of copper herein specified, as others having a similar effect may be used, but we believe not with so good a result, such as salts of lead or other metals, and which Chemists know to be capable of effecting the object herein described, that is, such as will be acted on chemically by the surface or materials employed to produce a transferred impression from a document.

In witness hereof, &c.

(Signed) HENRY GLYNN.

IMPROVEMENTS IN THE MANUFACTURE OF NITRATES, AND OF HYDRATE AND CARBONATE OF SODA.

(*Claussen's Patent, enrolled August* 3.)

THE improvements in the manufacture of nitrates consists of the decomposition and oxidation of ammonia, and of volatile compounds containing ammonia, whereby nitro-acids, and more especially nitric acid, is formed, care being taken immediately on the formation of the acid to bring it in its nascent state into contact with potash, soda, lime, &c., whereby a nitrate of either of these bases may be obtained.

To effect the required oxidation of the ammonia, an apparatus (the size and form of which is not described) is employed, in which is placed pumice-stone, charcoal, coke, platinum foil or sponge, or other substance capable of offering an extensive surface to the absorption of oxygen by the liquid ammonia in its passage through the porous material employed, care being taken to bring the fluid in its oxidized state into contact with the base required to form the desired nitrate, as, for instance,

nitrate of potash, &c. Such an arrangement of the apparatus may be adopted as will allow of the ammoniacal gas on its liberation from an ammoniacal salt (as for instance sulphate of ammonia) to be absorbed by water, and the solution thus obtained to drop on the surface of the oxidizing material employed. The distilled product of gas-liquor may also be directly employed in the formation of nitrates in the way above mentioned.

In the manufacture of hydrate and carbonate of soda, Mr. Claussen adds to a solution of sulphate of soda, a body capable of effecting the decomposition of that salt and liberating the soda. Hydrate of soda may be obtained by thus employing the hydrates of lime, baryta, and strontia, whilst carbonate of soda is obtained by long exposure of the hydrate to the air, the process of absorption of carbonic acid being much facilitated by frequent agitation.

Mr. Claussen states that both hydrate and carbonate of soda may be manufactured directly from common salt, by decomposing that substance by means of certain organic acids, which are afterwards decomposed by heat, by gaseous acids capable of decomposing chloride of sodium, by the decomposition of chloride of sodium, by hydrates, oxides, peroxides, and certain metallic bases, also by certain carbonates, carbonate of ammonia excepted.

IMPROVEMENTS IN OBTAINING CHLORIDE OF ZINC, CARBONATE OF SODA, &c.

(*Boulton's Patent, enrolled August* 24.)

In this case sulphate of zinc is decomposed by means of a chlorine salt. If either the chloride of calcium or of barium be employed, the solution of chloride of zinc obtained is decanted from the precipitate formed. If the chlorides of sodium or potassium be used, the chloride of zinc is separated by crystallization, &c., in the usual way. Ores of zinc may also be calcined with a salt containing chlorine, and chloride of zinc be thus obtained. If the ore contain carbonate of zinc, and the chloride of sodium or potassium be used, carbonate of soda or potash is also obtained.

To obtain sulphur or sulphuric acid, the sulphates are converted into sulphides by treatment with a carbonaceous substance, lime, and hydrogen gas, and from these sulphides the sulphur is expelled by means of steam, hydrogen gas, or any other gas containing hydrogen. If the sulphides of soda or potash be used, the carbonates of these bases may be obtained.

IMPROVEMENTS IN GALVANIC BATTERIES, AND USEFUL APPLICATION OF RESIDUARY PRODUCTS THEREFROM.

(*Mr. M. J. Roberts's Patent, enrolled August.*)

The first of these improvements consists in the employment of tin as the positive plate, in conjunction with platinum or some other metal which is electro-negative in respect to tin. The exciting fluid used is an acid, such as nitric or nitro-muriatic acid, capable of acting powerfully on tin. This acid may be employed either in its free state, or combined with some base which it will leave when brought into contact with tin. A solution of nitrate of copper, or of some other metal which is electro-negative with regard to tin, is best adapted to this purpose. Mr. Roberts prefers the employment of free nitric acid as the exciting fluid. The residuary product obtained in this case is oxide of tin (also termed stannic or meta-stannic acid), the addition of soda to which gives stannate of soda, a salt used by the calico-printer and dyer.

If nitro-muriatic acid be employed as the exciting agent, a chloride or bi-chloride of tin is produced, which is also used in dyeing and printing.

The residuary oxide is deposited in the cell containing the exciting fluid, which is made larger than the plates require. As it is thrown down in the form of hydrate, it takes a large portion of water with it, and by this means the strength of the exciting fluid is not diminished. The cells employed are formed of iron coated with enamel, glaze, or other suitable means of protection from the action of the acid contained in them.

Another improvement is that of employing copper as the positive metal, in conjunction with platinum or other metal electro-negative to copper; in this case also nitric acid is used as the exciting fluid. The residuary nitrate of copper obtained is of useful application in dyeing and printing. Mr. Roberts states that the improved battery is very economical in its use.

IMPROVED CHEMICAL COMPOSITIONS FOR MAKING GUN MATCHES

(*Winscarter's Patent, enrolled July* 29.)

First Composition.—Fulminating mercury 300 parts, chlorate of potash 288 parts, sulphate of antimony 312 parts, charcoal and saltpetre (mixed in the proportions of 16.7 of the former, and 63.3 of the latter) 60 parts, ferrocyanide of potassium 23 parts, binoxide of lead 6 parts, etheroxylin (containing 75 of pyroxylin to 150 of ether) 900 parts.

Second Composition.—Fulminating zinc 75 parts, chlorate of potash 4 parts, sulphate of antimony 7 parts, binoxide of lead 15 parts, etheroxylin 224 parts, ferrocyanide of potassium, 1 part.

Third Composition.—Amorphous phosphorus 75 parts, binoxide of lead 64 parts, charcoal and saltpetre mixture 15 parts, etheroxylin 106 parts.

The etheroxylin above mentioned is formed by dissolving pyroxylin, or gun-cotton (made by treating cotton wool, paper makers's pulp, or saw-dust, with a mixture of 12 parts of strong sulphuric acid and 6 parts of nitric acid, and well washing and drying the product) moistened with spirit of wine, to the proportion of ether before mentioned.

To effect the combination of these dangerous materials, a mixing machine is employed, consisting of a horizontal cylinder divided into two parts by a perforated plate, and having two pistons working in it, by the action of which, the materials in fine powder, are forced through the plate, first in one direction and then in the other, until thoroughly mixed; after which the composition is moulded into matches of the required shape and size, which, when dry, are used in the same way as percussion caps, and as substitutes for them.

REVIEW.

The London Dispensatory; *a Practical Synopsis of Materia Medica, Pharmacy, and Therapeutics.* Illustrated with many useful Tables, and Woodcuts of the Pharmaceutical Apparatus. By the late Anthony Todd Thomson, M.D., F.L.S. Eleventh Edition. Edited by Alfred Baring Garod, M.D. Longman, Brown, and Co. 1852.

The reappearance of this work seems to us like the return of an old friend after a long absence. But the renewal of acquaintanceship, instead of reminding us of the ravages of time and the debilitating effects of age, is, in this instance, accompanied by evidences of restored youth and increased energy. Few works of the sort have had a larger circulation, or been held in higher repute than Thomson's *Dispensatory*; but it cannot be denied that the author, in his declining years, had allowed a considerable number of typographical and other errors to escape correction, in addition to which the publication of new editions of the three British Pharmacopœias, had destroyed the value of the *Dispensatory* for one of the purposes for which it was designed as a work of reference, and it had therefore ceased for several years to occupy its accustomed place in the hands of the Pharmaceutist.

The London Dispensatory is the only remaining work in which the arrangement originally adopted, a hundred years ago, by Dr. Lewis in his *New Dispensatory*, and subsequently followed by Dr. Duncan in the *Edinburgh New Dispensatory*, has been retained. It, therefore, has the concurrent testimony which the sanction of three of our most eminent pharmaceutical writers, and a century of unabated popularity afford in its favour. For the purposes of the student we consider the arrangement, in its general features, the best that can be adopted, and with the exception of the defects to which we have referred, Dr. Thomson's work was especially adapted for the pharmaceutical student—therapeutics being made a subordinate subject. In the present edition, the editor states it has been his great aim "to preserve as much as possible the matter of the author, and only to make such alterations as the changes in the Pharmacopœias and the progress of science have rendered necessary." We think he has acted judiciously in this, and as far as we have observed, the changes which have been made are calculated to improve the character of the work, and if not wholly to remove, at least to lessen its defects; while the peculiar features and practically valuable matter, which gained for the *Dispensatory* its well-deserved popularity, are still retained unaltered. We regret, however, to observe a few errors, which lessen the value of the work as an authority on some chemical points.

BOOKS RECEIVED.

DISEASE IN CHILDHOOD: *its Common Causes and Directions for its Practical Management.* By ROBERT ELLIS, F.L.S., &c., &c. London: G. Cox, King William Street, Strand. 1852. 8vo, pp. 288.

AN ESSAY ON THE CAUSES WHICH INDUCE THE PREMATURE DECAY OF THE TEETH IN CIVILIZED COMMUNITIES. By J. L. Levison, D.D.S., Author of *Practical Observations on the Teeth and Gums*, &c. Brighton: Robert Folthorp. 1852.

TO CORRESPONDENTS.

A Member (Exeter).—Dr. Hooper says of *opodeldoc*, "A term of no meaning, frequently employed by Paracelsus. Formerly it signified a plaster for all external injuries, but now is confined to the camphorated soap liniment."

Æsculapius.—The formulæ given are both bad; sulphate of copper alone is better.

S. P. (Brighton).—(1.) Fownes's *Manual* or Turner's *Chemistry*.—(2.) Redwood's *Practical Pharmacy*.—(3.) The seeds should be bruised.

T. C.—We cannot recommend a substitute for the gall.

T. Collman.—*Common sealing-wax* may be made as follows:—black resin 6lb., bees'-wax 1lbs., Venetian red or red lead, 1lbs. Mix with heat.

C. H. (Leamington).—For marking-ink, see vol. vi., p. 419 of this Journal. We do not know the composition of custard powder.

Amator Scientiæ (Folkstone).—(1.) It should be diluted with water.—(2.) WATER FILTER, Mr. Alfred Bird's, of Birmingham.—(3.) Yes.—(4.) We presume a preparation of carthamus is used.—(5.) The lectures delivered at the Museum of Practical Geology.—(6.) Yes.

M. P. S.—Table-spoonfuls.

A. D.—(1.) In all cases where common water would interfere with the result, distilled water should be used.—(2.) Fownes's *Manual* is suited for a beginner.

R. B. D. (Chester).—The *Chemical Record* is the only "Weekly Chemical Journal."

George Smith.—The subject is under the consideration of the Council.

M. P. S. (Brompton).—TINCTURE OF INDIAN HEMP. ℞ Ext. Cannabis Ind. g. xcvj.; Sp. Vini Rect., f. ℥iv. Solve. Dr. O'Shaughnessy.

A. D. J. (Norwich).—TINCTURE OF SUMBUL. In the absence of any formula published on authority, we have adopted the following:—℞ Sumbul, ℥ij.; Proof Spirit, ℥xvj. Macerate seven days and strain.

F. (Islington).—See vol. vii., page 363; vol. ix., page 297. It is a case of sailing near the wind; but we think the stamp is not required.

An Esquirer (Bridport).—The regular course is to pass the minor examination first; and the major, not the same day, but some time after. The rule is not absolute.

Chemicus (Stonehouse).—Members who have seceded from the Society may be re-admitted on payment of arrears and a nominal fine.

Chemicus (Sunderland).—See the Report of the Special Meeting in this number.

Amicus.—(1.) No; the subscription is the same.—(2.) The Daguerrotype or Talbotype process.

E. H.—A Chemist could not be prosecuted for publishing an advertisement announcing his intention to practise in violation of the Apothecaries' Act; but if such advertisement were to meet the eye of a neighbouring Apothecary he might be watched, and if caught tripping a prosecution would follow.

I. D. (Merthyr Tydvil).—Dr. Pereira's *Materia Medica*, published by Longman, vol. i., 25s.; vol. ii., part i., £1 17s.; part ii. in the press.—Royle's *Materia Medica* (Churchill), 12s.

*** Several Correspondents will find their questions answered in the reports of meetings, and other parts of this number.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. CHURCHILL, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XII.—No. IV.—OCTOBER 1st, 1852.

THE ADMISSION OF MEMBERS INTO THE PHARMACEUTICAL SOCIETY.

DURING the past month the applications from Chemists desiring to join the Society, and the inquiries respecting the terms and mode of admission, have been so numerous, that for the convenience of all parties we quote the following Bye-Laws, which will serve as replies to most of the questions:—

"1. All persons desirous of becoming Members (except such Associates of the Society as were admitted prior to the 1st July, 1842, and except such persons as were or had been established on their own account as Chemists and Druggists at or prior to the 18th February, 1843) shall, in the first place, pass such examination as the Council shall think fit and require; and which examination shall be styled the Major Examination.

"2. Associates of the Society, who were admitted before the 1st July, 1842, shall on their applying to be admitted as Members, produce such certificates of qualification as may be required by the Council in conformity with the Charter.

"3. All persons who were or had been established on their own account as Chemists and Druggists, at or prior to the date of the Charter, namely, the 18th February, 1843, may, on being approved by the Council, be elected Members.

"4. All such last-mentioned persons must, previous to their being elected, give reference to Two Members of the Society, or other persons approved by the Council, who shall certify to the Council on such matters as may be required of them concerning the Candidate.

"5. Each person so elected as last mentioned, shall, in addition to the annual sums required to be paid by Members, pay the sum of Two Guineas as an Entrance Fee.

A new bye-law is under consideration, relating to the admission of those who commenced business after the date of the Charter and before the passing of the Pharmacy Act. This bye-law has been approved by the Council, settled by Mr. Tidd Pratt, and is now before the Secretary of State, whose approval and confirmation will be necessary. It will then, if so approved and confirmed, be submitted to a Special General Meeting of the Society for final confirmation. The principle of the bye-law is strictly in accordance with the resolutions passed at the last Special General Meetings, and also at several meetings held in the country, the reports of which are published in our last and present numbers.

The year being so far advanced it is not likely that many Members will join the Society until the month of December, as those admitted before the 1st of that month are required to pay the subscription for the current year.

We hope to be able, in our next number, to publish the new bye-law, by the authority of the Council, and at the same time to announce the Special General Meeting. In the meantime those who desire to join the Society should forward their applications to the Local Secretaries, or to the Secretary, Mr. G. W. Smith, 17, Bloomsbury Square, London. We suggest to the Local Secretaries the importance of retaining lists of those who are desirous of admission, keeping separate lists of those who were in business before the date of the Charter, and those who commenced after that date. This will greatly facilitate the proceedings with regard to admission when the regulations are completed.

THE EDUCATIONAL RESOURCES OF PHARMACEUTICAL STUDENTS.

"What course of study is recommended to those who are preparing to pass the examination?"

The frequent occurrence of this question in communications from correspondents, is a strong indication of an intention on the part of the rising generation to perform their share in bringing the Pharmacy Act into operation. It is obvious that the same answer would not be applicable to all inquirers, whose mode of proceeding must in some degree be regulated by their local position and other circumstances; we therefore purpose to take a bird's-eye view of the resources within reach of students in different localities. An apprentice in a country town, remote from any public institution in which scientific instruction could be obtained, is dependent on his own resources for the foundation of his education. He may acquire, by means of books and by studying the physical character of the substances used in the business, and the plants which grow in his neighbourhood, an elementary knowledge which will greatly facilitate his future studies. The amount of this knowledge will of course depend on the capacity and industry of each individual. We might adduce instances in which surprising results have followed the "pursuit of knowledge under difficulties;" these, however, are exceptions to the general rule. All that we wish to infer is that, with an average share of capacity, and a degree of application which every young man ought to bestow in learning his business or profession, an apprentice in a country town may acquire the rudiments of a Pharmaceutical education.

Some of the larger towns or cities furnish opportunities for improvement in the form of reading societies, scientific institutions, medical and chemical schools, &c.; and where these exist they should be resorted to by the Pharmaceutical student. In some places, which we shall specially notice, arrangements are completed; in others facilities exist, and could be adapted to the requirements of the Pharmaceutist on the occurrence of a demand for such accommodation.

The Liverpool Chemists' Association has been for some years in active operation. It provides courses of lectures, practical instruction in the laboratory, and accommodation for scientific meetings; it also has the nucleus of a library. The Transactions of the Association having been regularly published in this Journal, our readers are familiar with the regulations which afford to the student the opportunity of acquiring a sound knowledge of Chemistry, Materia Medica, Pharmacy, and Botany. The only circumstance to be regretted in this school is the small number of pupils who avail themselves of it.

In Manchester there has been a Chemists' Association in connexion with the Pharmaceutical Society. This has been for some time past in the *latent* state, but we understand that it is in contemplation to restore it to its former activity, and adopt measures in furtherance of Pharmaceutical education. We must not omit to notice an institution in Manchester which is calculated to assist in extending Chemical education. It is called the Owens' College, having been founded and endowed by the late John Owens, of Manchester, who, by will dated the 31st of May, 1845, bequeathed a fund, the income of which amounts to about £2000, to be invested in the hands of trustees for this purpose. The college embraces in its curriculum the branches of liberal education usually taught in universities, but we confine our remarks to the Chemical department. The laboratory is furnished with every convenience for analytical and practical chemistry. Each student has a separate working-table, tests, and re-agents, fuel, water, and gas. He is required to provide his own apparatus, except some instruments, &c., which may be had on loan under certain regulations. The fee for the session is £21; for five months £15 15*s.*; two months £7 7*s.*, &c. The general arrangements of the laboratory are similar to those of the Pharmaceutical

Society, the Royal College of Chemistry, University College, and other laboratories for practical instruction in the metropolis. It has accommodation for above thirty students, and is under the direction of Professor Frankland, who also delivers a course of lectures on Chemistry at nine A.M., four days in the week. Lectures on Botany and Materia Medica are delivered at the Medical Schools at Manchester.

Birmingham has been repeatedly mentioned in this Journal among the places where efforts have been made to adapt local means of instruction to the wants of the Pharmaceutical student. An Association is organised for this purpose, and it is capable of effecting much benefit, if conducted with spirit, and taken advantage of by the rising Pharmaceutists.

Bristol must not be passed over among the localities favourable to the progress of Pharmacy. Some of the Members of the Society at Bristol and Clifton have laid the foundation of an effective auxiliary institution. It has in some degree flagged for want of the stimulus of an Act of Parliament to drive young men to school. Renewed efforts are now in progress, which we hope will be attended with success.

At Norwich, an educational branch of the Society was formed in the year 1844. Its resources were limited: some standard works were collected, meetings were held, and a few lectures delivered, with a view of exciting in the minds of the young men a thirst for knowledge. The enthusiasm of Norwich, however, subsided, and for a time the Association has been dormant. At a recent meeting (reported page 158) a committee was formed to co-operate with the Council in carrying out the objects of the Pharmacy Act, and the attention of this committee will be directed to the important subject of education.

At Newcastle-on-Tyne, endeavours have been made to assist in the general progress of Pharmacy. A committee has been formed (as reported last month), and resolutions have been passed, declaratory of the importance of inducing assistants and apprentices to prepare for the examination. This can only be done effectually by means of education, and some of the lectures at the School of Medicine may be made available for this purpose.

York has its medical school, but no symptom of activity has yet manifested itself in that city with reference to Pharmacy.

The Chemists at Leicester have for some years been united into an Association for mutual improvement. It has not, however, assumed the form of a complete educational institution, but is calculated to promote this object.

At Exeter, Plymouth, and Bath, branches of the Pharmaceutical Society have been formed, and some of the leading members have endeavoured to establish regular meetings, libraries, and other means of mutual improvement. These efforts have been attended with only partial success, and we can scarcely enumerate these localities among those which possess any special educational resources.

Leeds, Hull, and Sheffield, are provided with medical schools, where lectures on Chemistry and the allied sciences are delivered, and our English universities, Oxford, Cambridge, and Durham, afford the opportunity of that kind of instruction to young men who may be disposed to take advantage of it.

In Edinburgh, the metropolis of North Britain, the appointment of a Board of Examiners in connexion with the Pharmaceutical Society, has had the effect of directing attention to the subject of education. A museum and library are in course of formation, rooms are engaged for holding meetings, and conducting the local business of the Society, and encouragement will be given to the apprentices of members to attend the lectures on Chemistry, Botany, and Materia Medica, which are delivered in connexion with the University.

An Association of Chemists has existed for some years in Aberdeen, where also the advantages of a University are within the reach of those who desire to improve themselves in any branch of science. The same remark applies to the other Scotch universities—Glasgow and St. Andrews.

In enumerating Medical Schools among the educational resources available to the Pharmaceutist, it must not be supposed that we recommend these institutions as unexceptionable, or furnishing all that could be desired. We are tracing the several means of education upwards with a view of assigning to each its real value and position in the scale, which commences at the country village, where the apprentice is dependent on books and his own sagacity, and terminates in the School of Pharmacy, designed especially for the education of Pharmaceutical Chemists, and comprising every arrangement for imparting the requisite instruction and defining the limits of his legitimate functions. Such an institution ought to exist in every civilized country, and the metropolis is the locality affording the greatest scope for a complete School of Pharmacy. Auxiliary schools may be conducted on a more limited scale in country towns, and in the absence of institutions specially designed for this purpose, any means of scientific instruction which may exist should be made available.

Local Associations of Chemists, even where no regular courses of lectures are delivered, have the effect of awakening the interest of young men in the science of their business, and may serve to direct them in their course of private study. Where a Medical School is at hand, and the professors are disposed to promote the object, valuable assistance may be obtained by means of lectures on Pharmaceutical subjects, or the students may attend at the School such courses of lectures as are applicable to their department. If these arrangements should not be capable of affording a complete education, they will at least lay the foundation, and enable the student afterwards to qualify himself at the School of Pharmacy in a much shorter time than he could have done without such preparation. Sooner or later it will become the usual custom for young men to come to London to finish their education. Edinburgh, Liverpool, and some other places may partially supply the demand in their respective localities, but "to this complexion we must come at last," that every apprentice must devote the last year of his apprenticeship to scientific education in a recognized school. The responsibility of carrying this into effect rests chiefly with parents, who must bear in mind the fact that the payment of an apprentice fee with their sons will not secure for them all that is required—a further expenditure will be necessary to complete their scientific education.

The School of Pharmacy in London furnishes a combination of advantages not to be found in other establishments, and may be resorted to by those who have served their apprenticeship in remote towns or villages, as well as by students who have obtained a partial education in a provincial institution. This School is in every respect adapted to the instruction of Pharmaceutical Chemists. In the laboratory the student goes through a complete course of practical study and manipulation. The processes prescribed or referred to in the Pharmacopœia are performed, and improvements or modifications of these processes are explained, bringing the Pharmaceutical knowledge of the student up to the present time. Analytical, as well as synthetical instruction is given, and the subjects selected for this purpose are those which are most likely to engage the future attention of the Pharmaceutical Chemist. Those who desire to prosecute more fully the science of general Chemistry, have every opportunity for so doing; but the primary and principal objects of study are those which specially relate to the business of the class of persons for whom the school is established. The lectures on Chemistry and Pharmacy are arranged on the same principle, embracing an insight into the general principles of the Science of Chemistry, and dwelling more minutely on the application of the Science to Practical Pharmacy. The discontinuance of Dr. Pereira's lectures on Materia Medica is much to be regretted. This is the result of the apathy of the assistants and apprentices for whose benefit they were delivered; for if the lecture-room had been crowded with attentive and studious pupils, it is not at all improbable that Dr. Pereira might have been induced to continue for some time longer his valuable course of instruction. The lectures on Botany are coupled with the privilege of attending

the Botanical Gardens in the Regent's Park, where medicinal plants are cultivated for the use of the students, an advantage rarely to be met with in establishments where lectures on Botany are delivered.

The Evening Meetings, the Library, and the Museum, are valuable auxiliaries to the other means of education afforded by the Society. These advantages, however, are not sufficiently appreciated, except by Members and Associates who reside at a distance from London, and who, therefore, have not the opportunity of attending. The metropolis contains many other institutions in which scientific instruction may be obtained, namely, the Royal College of Chemistry, University College, the Museum of Economic Geology, King's College, the Royal Institution, and the medical schools attached to the large hospitals. The nature of the education in these several schools is in some degree modified according to the respective objects of the establishments with which they are connected. The Royal College of Chemistry takes the highest range in that science. The student may here acquire a first-rate Chemical education. If a Pharmaceutist, he may be in danger of soaring above his vocation by entering too deeply upon analytical and abstract Chemistry. We have known this to be the case, and a distaste for the drudgery of the shop was the result. In one instance, a student who had qualified himself at Bloomsbury Square, preparatory to joining his father in partnership, attended for a few months at the College of Chemistry, and his attention being diverted into the higher walks of the science, he abandoned his business altogether. This would not be so likely to occur if a Pharmaceutical class were formed, which might be attended with advantage, as the demand for that branch of chemical education increases. The above remarks are equally applicable to schools at University College, King's College, and the Museum of Economic Geology, which are also devoted to high Chemistry rather than Pharmacy, but might be resorted to by the Pharmaceutical Chemist. The laboratory at Bloomsbury Square has scarcely enough accommodation for the present demand, and if the number of applicants should considerably increase, which is not improbable, the other chemical schools will be called into requisition to supply the deficiency.

The lectures at the medical schools, although to a certain extent available, are not specially adapted to the Pharmaceutical Chemist. The lectures on Materia Medica are combined with Therapeutics, and are more particularly addressed to medical students. Toxicology is chiefly medical toxicology, and connected with medical jurisprudence. Pharmacy is not separately taught in these schools, and the lectures on Chemistry give a general knowledge of the science, leaving the student to apply it to such purposes as he may require. Those who attend such schools for the purpose of qualifying themselves in Pharmacy, should be cautioned not to be led astray by the medical influence around them; they will see and hear constant allusions to medical and surgical practice; they will find that their fellow-students, being doctors in the *nascent state*, attach great importance to Medicine and Surgery, and look down upon Pharmacy as an inferior and secondary pursuit; and they may be tempted to go with the stream and acquire a smattering of medical knowledge, under the idea that this will qualify them for carrying on a snug empirical practice when they commence business as Chemists. This delusion ought to be dispelled, and the student should be made sensible of the fact that the respectability and character of the Pharmaceutist will depend upon his knowledge and experience in his own legitimate business, and not on the encroachment on responsible functions for which he is not legally qualified. It is one of the advantages of a School of Pharmacy that not only are the lectures and practical instruction adapted to the requirements of the Pharmaceutist, but the students are taught the limits, so far as it is possible to define them, between their duties and those of the medical practitioner. Their education is carried to the full extent in the right direction instead of being combined with other subjects calculated to divert them into other channels.

To show that the School of Pharmacy has not yet been duly appreciated by

the Associates and Apprentices in London, we may advert to the fees payable at the schools to which we have referred for the several courses of lectures. The average fees for an entire session may be stated as, Chemistry, £6 6s.; Materia Medica, £4 4s.; Botany, £4 4s.; making £14 14s., without including Practical Pharmacy. The above courses at the School of Pharmacy, Bloomsbury Square, including Pharmacy, but omitting Therapeutics, have been offered to students belonging to the Society for £4 14s. 6d., and last session without fee. Yet, in consequence of the small attendance, it has been deemed expedient to curtail the lectures. From the above brief outline of the educational resources of the Pharmaceutical student, it will be seen that these resources are various, that they exist in many localities in which they have not hitherto been taken advantage of, that at the fountain-head, where every exertion has been used to provide the best Pharmaceutical education at a nominal charge, or even without fee, the lecture-room is thinly attended, and young men, with an unaffected simplicity which is truly remarkable, inquire, "What course of study is recommended to those who are preparing to pass the examination?"

TOXICOLOGY.

Several of the medical witnesses before the Select Committee on the Pharmacy Bill objected to the examination of Pharmaceutical Chemists in Toxicology. It was alleged that this was a medical subject, and at the desire of the Society of Apothecaries the word Toxicology was erased from the Bill.

It is on record that once upon a time two valiant knights were preparing to engage in single combat for the purpose of deciding a dispute respecting the colour of a shield, one having declared that it was white, the other black. Just at the time a priest came up, and suggested that each had better look at both sides of the shield, when they discovered that one side was white, the other black.

Toxicology may be compared to that shield. It has two sides, a medical and a chemical. We have repeatedly pointed out this fact, but some of our medical friends have been so long in the habit of viewing it only on one side, as a branch of medical jurisprudence, that they cannot be induced to turn it round and look at the Chemical side.

The toxicologist, unless a Chemist himself, cannot proceed a step without calling in the aid of a Chemist. By what means is the presence of a poison detected? By chemical analysis.—What determines the nature of an antidote? Chemistry. Who is the most important witness at an inquest in a case of poisoning? The Chemist—for unless the presence of the poison be proved, all other testimony either falls to the ground or assumes the character of inferential or circumstantial evidence. The medical treatment in cases of poisoning is another branch of toxicology. This is the medical side of the question. Yet the entire subject is so connected in some of its details that it assumes a medico-chemical character. The vital action modifies the chemical properties of poisons, and the processes of assimilation, digestion, and morbid changes must be understood by the Chemist; while the chemical action of poisons on living tissues, whether healthy or otherwise, and the counteracting effects of antidotes must also be understood by the Medical Practitioner. The report of a case of poisoning with the subsequent investigation, if drawn up in a manner calculated to be practically useful, contains of necessity allusions to matters both medical and chemical, and no such report would be complete unless it combined the results of the chemical and medical investigations. In France and Germany the most eminent Toxicologists are Chemists or Pharmaciens, and in the education of that class the study of poisons occupies a prominent position. If the word toxicology be objectionable another word may be coined; but this will not alter the fact that the Pharmaceutical Chemist must be acquainted with the properties, doses, and effects of poisons, their tests, and antidotes. We have been induced

to make these observations at the present time, in reference to a case of poisoning reported in another part of this number (page 199).

If the Chemist in this case had not possessed the requisite knowledge of toxicology and the doses of medicines, he would have furnished without hesitation the unsafe dose of Dover's powder ordered by the patient, who, in all probability, would have taken the whole of it. The prescription for the injection having been written by a medical man, who had given verbal instructions to the patient respecting the use of it, the Chemist was not responsible; but if the patient had been prescribing the injection for himself, Mr. Savory would have used the same precautions which he did in regard to the powder. Thirty grains of Dover's powder would not, under ordinary circumstances, be a poisonous dose for an adult, and two drachms of Battley's liquor opii. might be administered as an injection without a fatal result; yet either of these doses might be attended with serious consequences, of which a Chemist would not be justified in allowing a patient to run the risk, *unless under medical advice*. The effect of both together would decidedly be sufficient to endanger life in a patient of ordinary constitution. It is the duty of the medical practitioner to ascertain the limits of a safe dose of a medicine. This having been settled, it is necessary that the Chemist should know it. The comparative effects of medicines when swallowed and when administered in the form of injection, is a medical question. The dose of tincture of opium is stated in the Pharmacopœia to be from fifteen to thirty minims,—when used as an injection thirty minims. In the Edinburgh Pharmacopœia the quantity stated for an injection is from half a drachm to a drachm. Assuming that Battley's liquor opii. is about the same strength as laudanum, or rather stronger, the injection prescribed for Major Forester contained a quantity equivalent to not less than six grains of opium. It appears that rather less than half the injection was used, and about 8 grains of Dover's powder having been taken, the total quantity of opium administered may be estimated at between three and four grains.

Dr. Taylor states, "As a suppository five grains are sometimes prescribed; but I have known this quantity to produce alarming symptoms in a healthy adult." Two drachms of tincture of opium when swallowed have been known to cause death. Four grains of crude opium have also proved fatal. But there is probably no medicine the effects of which vary so much from idiosyncrasy, or the habits of the patient. Dr. Christison mentions the case of a person who at one time took nine ounces of tincture of opium daily. Opium is also cumulative in its effects. A person unaccustomed to this medicine, after having taken several moderate doses at regular intervals, may be suddenly attacked with the symptoms which would have been produced by one large dose. Under these circumstances it is often very difficult to arrive at clear and satisfactory conclusions in cases of death supposed to result from opium. Sufficient, however, is known to induce the Pharmaceutical Chemist to use every precaution in regard to this drug.

THE OPERATION OF THE SALE OF ARSENIC ACT.

There are two modes in which this Act is intended to protect the public against fatal results from the improper use of arsenic; first, by affording the means of tracing arsenic to or from the possessor when sold; and, secondly, by prohibiting the sale of arsenic in small quantities for domestic purposes. The first object is to be attained by the registration of every sale of arsenic, the second by the provision that all arsenic sold by retail shall be mixed with soot or indigo. It is now clearly understood that when a person applies at a shop for a small quantity of arsenic for poisoning rats, the name, address, and occupation of the purchaser, the date, with other particulars, must be registered in the arsenic book, and the arsenic must be disguised (black or blue) as the Act directs.

If the Act had done no more than this it might have been easily evaded. Preparations of arsenic equally deleterious and dangerous might have been sold instead of the white arsenic in substance. But the Act declares that the term *arsenic* shall be construed to include *arsenious acid* and the *arsenites*, *arsenic acid* and the *arseniates*, and *all other colourless poisonous preparations of arsenic*. The only exemptions in the Act relate to the sale of arsenic when compounded by the orders of medical practitioners, and the sale of arsenic by wholesale to retail dealers upon orders in writing in the ordinary course of wholesale dealing. In cases where arsenic mixed as the Act directs would be unfit for the purpose required, it may be sold unmixed in a quantity of not less than ten pounds at any one time. In all cases, however, excepting when it forms an ingredient in a medical prescription, the sale must be registered as evidence of the destination of the arsenic and the purpose for which it is required. The Act is, therefore, perfectly clear and intelligible with regard to the undisguised sale of arsenic or its preparations; but doubts have arisen respecting certain proprietary compounds sold for poisoning rats, flies, and other vermin, and containing arsenic as one of the ingredients. A case of poisoning occurred in July last from the incautious exposure of a poisonous mixture of this kind. The following is the report of the inquest, from the *Daily News* of July 29th:—

"Yesterday Mr. William Baker, deputy coroner (for Middlesex), held an inquest at the Amhurst Arms, Kingsland, on the body of Stephen A. Curtis, two years old, the son of a city merchant, who has a country residence at Kingsland. On Monday morning the child, while the servant's back was turned, tasted a quantity of a poisonous mixture intended to kill cockroaches, from the effects of which he died in a few hours. Verdict, accidental death."

We are informed that death ensued about four hours after the poison was taken, and, on examination, both the contents of the bottle and the matter vomited were found to contain arsenic. The compound is sold under the name of "cooling physic," with the following label:—

Each ounce of this COOLING PHYSIC contains about fifteen grains of arsenic held in solution by an alkali in a mixture of treacle and water! A drachm would be sufficient to poison an adult, it is attractive to children, and especially adapted for family poisoning. A "family bottle" would be sufficient for a great many families.

If the coroner, at the inquest above reported, had known the facts of the case, and understood the operation of the Arsenic Act, he would have instructed the jury that the vendor of the cooling physic was liable to a penalty under the Act. In our opinion, there were grounds to justify a verdict of Manslaughter.

That no doubt may exist on the subject, we quote the third clause of the Act:

"3. No person shall sell any arsenic unless the same be before the sale thereof mixed with soot or indigo in the proportion of one ounce of soot or half an ounce of indigo, at the least, to one pound of the arsenic, and so in proportion for any greater or less quantity: provided always, that where such arsenic is stated by the purchaser to be required, not for use in agriculture, but for some other purpose for which such admixture would, according to the representation of the purchaser, render it unfit, such arsenic may be sold without such admixture, in a quantity not less than ten pounds at any one time."

If the sale of such compounds were to be tolerated, the Arsenic Act would be a dead letter. The cooling physic contains an ARSENITE, it is *not coloured* with *soot* or *indigo*, it is *not prescribed* by a *medical practitioner*, it is sold in a quantity *less than ten pounds*, the sale is *not registered* in the arsenic book as the Act directs. Consequently, every person selling a bottle of this cooling physic, or any other compound of a similar nature, is liable to a penalty of £20.

We did not receive the particulars of this case until last month, and had not previously ascertained the composition of the cooling physic, otherwise we should not have allowed so much time to elapse without giving publicity to this reprehensible mode of retailing arsenic to the public.

PROVINCIAL TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY.

EDINBURGH.

THE Board of Examiners for Scotland will hold their next meeting on Wednesday, 6th October, at eleven o'clock forenoon, in the Society's Rooms, 72, Princes Street, Edinburgh.

Parties desirous of availing themselves of the above opportunity are requested to communicate with the Secretary, 121, George Street, Edinburgh, a few days previous to the day of meeting, and to transmit such testimonials or certificates as they may wish the Board to inspect.

JOHN MACKAY, *Secretary*.

Edinburgh, 20th September, 1852.

BIRMINGHAM.

A MEETING of the Chemists and Druggists of Birmingham is announced to be held on Tuesday, October 12th, at 11 A.M., to consider the Pharmacy Act, and the best means of promoting Pharmaceutical education.

LIVERPOOL CHEMISTS' ASSOCIATION.

The first meeting of this Association for the current session took place on Friday evening, at the Royal Institution, Colquitt Street, on which occasion a very interesting lecture on Pharmacology, or Materia Medica, was delivered to the members by Dr. Dickinson. Mr. Mercer, a Member of the Council, in the absence of the President, took the chair.

Mr. John Abraham, the honorary secretary, announced that at a recent meeting of the Council Mr. Sumner was elected President of the Association; Mr. Edward Evans, Treasurer; himself (Mr. Abraham), Secretary; and Dr. Edwards, teacher of Practical Pharmacy.

The Chairman then said that the subject of the Lecture that evening was one which had not yet been brought before the Society. They had been very late in taking up Materia Medica, but he hoped that if they once began they would follow it up continuously, so that they might have lectures on different subjects in Materia Medica through the session. For instance, one might take the acids, another the alkalies, another the purgatives, another the gums, and so on. He remembered reading a report of the Birmingham Pharmaceutical Society, in which it was stated that the Druggists there had each taken a part, and he was sure that great advantage would be derived if the same practice were adopted by the Members of the Liverpool Association.

Dr. Dickinson commenced his lecture by observing, that when the worthy Secretary of the Association asked him, about a week or ten days ago, to give a lecture upon Materia Medica, he was very reluctant to do so,—in the first place, because he had very little that was novel to offer; and 2ndly, because his time, at present, was very much occupied. However, unwilling that the Society should be at a loss for a lecturer to come before it on such a subject, he ventured to lay before them the following remarks. The editor of one of the leading medical periodicals thus wrote:—

"We ask the question—Is there in the Pharmaceutical press any wholesome restriction whatever as to the scope of study proper for the Chemist? Are not *therapeutics* constantly mixed up with Materia Medica, though for the comprehension of them the study of Anatomy, Physiology, and Pathology is essentially requisite, and without which a smattering of therapeutic information must be extremely dangerous if exercised upon the sick? Is not Toxicology openly grafted on the Pharmaceutical courses of Chemistry, Botany, and Materia Medica? What does it mean? Is the Chemist to be taught the antidotes to poison, and not permitted to use his partial knowledge? Or if the Chemist is to use his toxicological knowledge, it is tantamount to saying he is an actual Medical Practitioner, fitted to act in the gravest emergencies that can occur. Again, if the Chemist and Druggist is to use his imperfect knowledge of Toxicology, what must become of medical jurisprudence? Who is to supply the evidence for the defence of the innocent and the punishment of the guilty? Are we to depend for these things upon the Toxicological Druggists? On every side, in pursuing this subject, considerations of the gravest character arise before the reflective mind,—considerations as important to the Chemist as to the Medical Practitioners. And who are the parties who supply this kind of partial information, this 'little knowledge,' which, in medicine, so pre-eminently is but 'a dangerous thing?' They are Physicians, public lecturers, who are teaching the same things at the same times to Medical Students. The matter will not bear the test of common honesty, that they should teach to extra-professional persons that knowledge for which Students pay them, and upon which Students depend in the future practice of their profession. (As well might they invite Druggists at once to attend their professional courses on Toxicology, Materia Medica, and Therapeutics.) We are the more struck with these things, because of seeing recently the prospectus of a flaunting and tawdry periodical,* addressed to the rising thirty thousand Druggists' and Chemists' Assistants, in which medical men, lecturers, and hospital physicians were paraded by the dozen as contributors in embryo. We confess we have looked in vain for any repudiation of such a scandal from the parties thus implicated. They are accused of professional suicide, and they sit silent under the accusation."

To this accusation he (Dr. Dickinson), as one of the accused, replied,—We have no fear that either the interests of our profession as a class, or those of the great

* *The Pharmaceutical Times.*

body of society, which is of infinitely more importance than those of any class, will or can suffer by the more complete training and development of the minds of the rising generation of Chemists, or by a more extensive and profound acquaintance with the principles and details of the various branches of their art and science. On the contrary, we are profoundly impressed with the conviction that the highest and best interests of the practical physician are most intimately connected with the progressive, and, we hope, rapid advance of Pharmaceutical education, in which, besides Botany, Chemistry, practical Pharmacy, and Materia Medica, we would most especially include (as is done in France and Germany) Toxicology. Is the surgical instrument-maker less likely to improve the manufacture of proper instruments by being made acquainted with the structure and nature of the objects for which these instruments are formed, and will he be tempted, on account of this information, to step out of his own sphere and usurp the province of the operating surgeon? But it was worse than useless (the lecturer observed, in continuation) to occupy their time further on this subject, for even the most common mechanic felt, in the present day, that he ought to be acquainted, more or less, with the scientific principles of his art; and it seemed monstrous to forbid to intelligent men, called upon to practise the most delicate chemical processes, and to prepare and conduct the sale of medicines, many of which were of a most poisonous nature—it was monstrous to deny to such men the most ample means for acquiring a perfect knowledge of the nature and scientific uses of the articles in which they dealt, or to confine their intelligence to the mechanical routine of the shop without the elevating and expanding influences of the study and the lecture-room. It had been justly remarked that when the mind of a Chemist is properly stored with this valuable knowledge, when he feels conscious that his character and position in society are dependent on his qualification for his own scientific occupation, what inducement can he feel to transgress the boundary of his proper functions? There was in his own department ample scope for the exercise of his abilities, for the pursuit of fame, for the acquirement of subsistence. The most eminent men of the medical profession, both in this country and on the continent, agreed in the desirableness, if not the absolute necessity, of committing the sale and preparation of medicines to the Chemist, and of restricting the Medical Practitioner to his proper vocation, the practice of medicine and surgery, at least in large towns; and in some countries on the continent this separation of Pharmacy from medical practice was strictly enforced. Medical men were prohibited under a penalty from selling medicines, and Pharmaciens from practising as medical men. There were, of course, some exceptional cases; for example, in villages where the division of labour could not be carried out, medical men might sell medicines on obtaining a licence from the government authorities; and in cases of emergency, or the necessities of the poor, Pharmaciens occasionally administered medicines according to their judgment. But this was done to so limited an extent that it did not amount to an abuse, and did not appear to occasion jealousy in the medical profession. Now, what was compulsory by law in France ought to be compulsory from moral principle in this country. The British legislature had now recognised a class of persons as the representatives of Pharmacy in this country with a distinctive title, and prohibited the unauthorised assumption of that title under a penalty. The Pharmaceutical Society was the depository of the powers conferred by the Act, the Members were the parties recognised, and the fraudulent assumption or exhibition of a sign denoting membership was punishable as a misdemeanour. It had, however, been justly remarked that the value of the distinction conferred upon the Members would depend entirely upon the Pharmaceutical Chemists themselves. It would be a fatal mistake to suppose that, because an Act of Parliament had been carried, nothing remained to be done. The Act might encourage and stimulate; it might promote the advance of the art and science of Pharmacy, and raise the character of those who came within its influence; it pointed out the road to distinction, but it left the direction of it entirely in the hands of the Chemist himself; it provided the locomotive engine, but those who desired to have the advantage must put on the steam. Education was an individual work; "and respecting the educational functions of the Pharmaceutical Society the Pharmacy Act leaves the question where it was." He could not forbear here alluding to a very able "Report, addressed to the Minister of Public Instruction, on the Organisation of the Schools of Pharmacy in France." In this valuable document it was stated that "the right to prepare and sell medicines is regulated by law," and is entrusted to three classes of persons:—1. Herborists s

who are authorised to sell medicinal plants and simple drugs, but who can neither prepare nor sell compounded medicines; 2. Officers of health (*officiers de Santé*), who, in districts in which there is no Pharmacien, are permitted to supply the sick with simple or compound medicines, but cannot keep an open or public shop; 3. Pharmaciens, who have the exclusive right to open shops for the preparation and sale of compound medicines. It was well known that the Pharmacien of France had long occupied a much higher position than the English Druggist. "The state has provided that no one shall execute the responsible duties of a dispenser of medicines who is not duly qualified by the possession of all the necessary knowledge. A high standard of scientific attainment has for many years distinguished the Pharmaceutical body of that country, and from its ranks many honoured names, dear to science, might be quoted." The commissioners before alluded to make the following most just remarks:—"To judge of the utility of these [Pharmaceutical] Schools, let us examine what are the qualifications requisite in a good Pharmacien, and what are the best means of acquiring them. Society should require from the Pharmacien various accomplishments, but especially relating to two classes of facts—first, the characters and properties of substances, whether medicinal or toxicological, and of the bodies which furnish them; secondly, the operations, chemical and mechanical, by which these materials are prepared and reduced to the state in which they are prescribed by the physician. It is, then, evident that Chemistry, Botany, Materia Medica, or the natural and Pharmaceutical history of medicinal substances, and Toxicology must form the foundation of his studies. He must also be acquainted with certain laws of physics, and should be quite familiar with all operations relating to the preparation of medicines and the dispensing of medical prescriptions. This latter part of his education can only be acquired by practice in his business, and the [French] law requires from every candidate some years of this practical experience. But the scientific knowledge which we have just enumerated cannot be obtained by the study of books only, nor by the daily practice of the operations of the shop." The pupil could only acquire it by means of methodical instruction, under the direction of a competent teacher, and by performing himself the experiments which throw light on the physical properties and chemical phenomena of bodies, the knowledge of which was indispensable to the perfect and satisfactory discharge of his art. Nor was the knowledge of botany less necessary than chemistry to the perfect practice of his art, and the full comprehension of the Materia Medica. Indeed, this branch of science seemed to him far more necessary to the Chemist and Druggist than it was to the Physician, inasmuch as the former had constant need of it in the procuring, preparing, and preserving vegetable medicinal substances, and ought not to be under the necessity of trusting entirely to the herbalist or wholesale dealer; whereas the physician, in by far the majority of instances, only saw the medicines he prescribed when made up, seldom witnessing the raw material of which they were composed. Toxicology was also essentially necessary to the scientific Chemist, at least that part of it which is dependent on chemical and botanical knowledge—the knowledge of tests and antidotes. Indeed, few medical men were competent to conduct the necessary analysis, and to whom should they, in such a case, so naturally turn as to the Chemist? Dr. Dickinson then proceeded to the subject of Materia Medica, using the term as comprehending both Pharmacology and Therapeutics, with which latter branch he considered it absolutely necessary that a Dispensing Chemist should be more or less acquainted in order to prevent the injurious and even sometimes fatal mistakes inadvertently made in prescribing, or from ignorance in family recipes. He said that in studying the Materia Medica, besides the history, origin, properties, and preservation of simples, they had to consider—1. The effects of medicine, and the means of ascertaining these effects; 2. The modes of action, and the circumstances by which these are modified; 3. The modes in which they are administered; 4. The various systems of classification. He then glanced at two or three points in connexion with the subject, observing that to attempt to give even a sketch of these various branches would require more than two or three lectures. In speaking of remedies, the medical man did not consider himself so far only a doctor. He looked upon remedies as of two classes—1. Psychical, or those which related to moral and intellectual agencies; 2. Corporeal, or, as they had been sometimes called, somatical agents. After giving examples of these, and glancing at the general nature of the effects of remedies, the lecturer proceeded to consider and explain the three methods

of employing medicines, founded on the three relations between the symptoms of disease and the specific effects of medicine—namely, antipathy, homœopathy, and allopathy. He next referred to the different means of ascertaining the effects of medicines, under four principal heads, derived from sensible qualities, and chemical, dynamical, and natural-historical properties. With regard to trusting implicitly to what is called experience, he remarked, that there was no absurdity in therapeutics which had not called in *experience* for its support. Lord Bacon even believed in the efficacy of amulets, because experience had proved their value; Boyle, the great and learned, trusted for the same reason to the thigh-bone of a man as the best remedy for dysentery; Linnæus to strawberries for the cure of gout. Need he mention the sympathetic powder of Sir Kenelm Digby; the royal touch; the influence of coral beads worn round the necks of children to prevent fits? The old works on medicine are replete with such absurdities, yet all claim experience as their never-failing sanction and support. Of course he spoke of false experience. He concluded by quoting the following observations of Dr. Paris:—

"Medicines are, for the most part, but relative agents, producing their effects in reference only to the state of the living frame. We must, therefore, concur with Sir Gilbert Blane in stating that the virtues of medicine cannot be fairly essayed, nor beneficially ascertained, by trying their effects on sound subjects, because that particular morbid condition does not exist which they may be exclusively calculated to remove." Dr. Robertson has well observed that "disease calls forth the powers, and modifies the influences of medicines. That which agitates the calm of health may soothe the irritation of illness, and that which, without opposition, is inert, may be powerful when it meets with an opponent."

The Chairman was sure that there was not a person in the room who would not leave it a wiser man than when he entered it, and he only regretted that a larger number of the Members of the Association were not present.

Dr. Dickinson said that the few remarks he had made had been hastily prepared, and he was afraid they must have appeared so to the Members. Upon some future occasion, when he could do so with more satisfaction to himself, he should have pleasure in coming before them again. He did think that the Chemists and Druggists of Liverpool were not sufficiently alive to the high position and noble calling to which they might fairly and honourably aspire. It was a vast thing to have the dispensing of those agents which were to restore the husband and father to his family, and to carry out the great objects of benevolence; and no medical man but must be deeply impressed with the conviction that his own services, his own prospects, and his own usefulness, were essentially bound up with the rapid and steady improvement of the Chemists and Druggists. He made it a rule, as far as he could, with regard to the preparation of his prescriptions, not to interfere with the liberty of the subject: that was a thing which was betwixt the patients and those with whom they dealt; but at the same time, in certain districts, you were compelled, for self-preservation, to make inquiries, in order to ascertain whether there was a Chemist and Druggist in the neighbourhood to whom the preparation of prescriptions might safely be entrusted. That ought not to be. The Chemist ought to be thoroughly qualified in his own particular department in all that related to the history, the procuring, the preservation, the compounding, and the dispensing of medicines; and he would even say also that a knowledge of the immediate effects of remedies should belong to the Chemist and Druggist, the dispenser. Instead of the medical man being under the necessity of imparting to him a knowledge of chemical properties, the Chemist ought to be prepared to impart to the medical man that knowledge. The medical man and the Chemist had each his own department and profits, and if the division of labour were carried out in that way it would be found to be more satisfactory to both parties. He did not think that any medical man in a large town was justified in dispensing his own medicines. He thought the practice had an injurious effect upon the mind of a medical man and upon society at large. On the other hand, a Chemist and Druggist, if he wished to do as he would be done by, would never attempt to treat a case. If a mother took a child to him he might order some simple thing for the time being; but if he was a conscientious man he would desire her to go to a medical man. Counter prescribing could not be done away with. No law could take it away. It was the abuse of it which must be condemned.

The Chairman afterwards exhibited a newly-invented plaster iron, hollow, and having at the back a number of perforations for the escape of gas. When used it is

attached by an elastic tube to a gas-pipe. The gas escaping from the perforations is then ignited, and kept burning whilst the instrument is used, which of course it keeps hot. He also exhibited some true Persian tar, or naphtha, imported by Mr. Bailey, of Wolverhampton, and a specimen of German creosote, which was colourless. The meeting then broke up.

MEETING AT NORWICH TO CONSIDER THE PROVISIONS OF THE PHARMACY ACT.

A MEETING of Chemist and Druggists was held on the evening of Thursday, September 9th, at the Norfolk Hotel, Norwich, for the purpose of receiving from Mr. Jacob Bell an explanation of the provisions of the Pharmacy Act, and of considering what steps it would be advisable to take in reference thereto.

Mr. FITCH presided, and briefly explained the object for which the meeting had been convened.

Mr. JACOB BELL then explained the provisions of the Act, adverted to the circumstances which had led to its introduction, and offered some suggestions as to the course which it was desirable to pursue for bringing it into effect.*

Mr. CUBITT—I should like to ask a question or two. Are the Chemists and Druggists, who were in business previous to the year 1843, admissible as members of the Pharmaceutical Society?

Mr. BELL—The larger portion of them—those who occupy a respectable position as Chemists and Druggists.

Mr. CUBITT—You would not admit them indiscriminately?

Mr. BELL—Certainly not.

Mr. CUBITT—What test would you require of their qualification for membership in cases where you do not enforce an examination?

Mr. BELL—The Council are of opinion that the sanction of the public given to those who were in business prior to the date of the Charter, would afford some guarantee of their fitness for membership; but as a further precaution the recommendation of two of the present members is required.

Mr. CUBITT—What plan will be adopted by the Council as regards those who have entered business since the charter has been obtained?

Mr. BELL—That question is now under the consideration of the Council.†

Mr. CUBITT—Until what time will you continue to admit members without examination?

Mr. BELL—Till next May.

Mr. CUBITT—Are those who are now apprentices to the business, or those who were apprenticed after the charter was obtained and have since become assistants, in a position to enter the Pharmaceutical Society as members without examination?

Mr. BELL—The present apprentices, and those assistants who were apprenticed after the charter was obtained, must all pass the usual examination before they can be admitted to membership.

Mr. CUBITT—Are those who join the Society prior to May next, and who have not contributed anything to its present funds, to be admitted free of expense?

Mr. BELL—No, a fee of two guineas will be charged.

After a few other questions from different gentlemen, which called forth answers more fully explaining the previous remarks,

Mr. CUBITT said—I am sure it is a source of considerable pleasure to us all to see Mr. Bell amongst us this evening. It has been my privilege frequently to meet him on the Council, and I am satisfied that there is no individual who has taken a greater amount of interest in our trade, or who has exerted himself more than he has done to promote its prosperity; and I am happy to think that his exertions are likely to be crowned with success. I believe the time has now gone by when the cause of a disregard to the claims of this Society will remain upon any places of importance in this kingdom. From the reports in the last number of the *Pharmaceutical Journal*, I find that at Bristol, Nottingham, Newcastle, Manchester, and Liverpool, influential meetings have been held, and to prove that differences of opinion and of feeling upon the subject are fast ceasing to exist, I may mention that persons

* See the Reports of Meetings in our last number.

† See the first page of this number.

are travelling great distances, even from Scotland, in order to give their sanction to an undertaking which is intended to promote the general benefit and well-being of the Chemists at large. In Norwich there are many who have stood aloof from this Society, and who have allowed some few of us to bear all the trouble and expense; but I think that the position in which Mr. Bell has placed the entire matter to-night must have plainly pointed out to every one present that the objects sought by the Pharmaceutical Society are highly important, and that it is the duty of us all as men, and as Chemists, to do all we can to support it. I think, on these grounds, that you will all most willingly support the resolution which I have now the pleasure of moving:—

"That in order to give an immediate and permanent effect to the Pharmacy Act, and to extend its operation, it is important that the Pharmaceutical Society should include among its members all duly qualified dispensing Chemists in the United Kingdom."

Mr. THOMPSON had great pleasure in seconding the proposition.

Mr. REDGRAVE complained that the Pharmaceutical Society had been too liberal in the admission of Members. A Chemist occupied a very responsible position, and the commission of an error in dispensing a prescription might be attended with fatal consequences, and yet he had, during the last week, been in the shop of a person who professed to be a Chemist and Druggist, and who had his diploma from the Pharmaceutical Society publicly exhibited, but who was at the same time positively unable to construe a Latin prescription. That, he thought, was opening the door rather too wide. Why, he asked, should the Society place such a man on a par with those who became members by incurring a vast deal of trouble and expense in qualifying themselves?

Mr. BELL said it was quite at variance with the intention of the Society to open the door of membership to every huckster; indeed, the real object was to admit no one except on a certificate which would satisfy the Council that he was not one of that class. On the first establishment of such a Society, however, it was impossible to be so strict as they must subsequently be, and for many years past it had been required that every candidate for membership should be recommended by two members. The local secretary was applied to for information in case any doubt existed, and if at any time the object had been frustrated by the indifference of any local secretary or other accident, it was very much to be regretted. Such an accident, unfortunately, might occasionally happen, but it was the desire of the Council to receive no persons into Membership who would bring discredit on the Society.

The resolution was then unanimously adopted.

Mr. J. D. SMITH expressed his full concurrence in Mr. Cubitt's remarks, and dwelt at some length upon the importance of education to Chemists and Druggists. He himself had been placed behind the counter while very young, and he wished the young men present to know that he every day felt the consequent disadvantage of his position, as a man professing to be a Chemist and Druggist, inasmuch as he had not had that education which he now felt to be so desirable. He said this most plainly and distinctly, because he was desirous that the young men should feel with him the importance of education, and the necessity of their making use of every possible exertion in acquiring that information which would be essential to them throughout life. No profession could be more interesting, no science more delightful, than that in which they had embarked; but study, close and constant, was necessary, for it very much rested with the young men themselves in their endeavours after improvement and advancement, whether they would be able to carry on their business efficiently, and to the satisfaction of the public. Mr. Bell, he thought, had shown them the true position which the Chemists and Druggists of this country now occupied, and their relation to the new Pharmacy Act, and with a view to further the objects for which this Act was intended, he would now move:

"That the following gentlemen, with power to add to the number, be appointed a Committee to co-operate with the Council in London in carrying out the object of the first Resolution:—Mr. Fitch, Mr. Cubitt, Mr. J. D. Smith, Mr. Thompson, Mr. Redgrave, and Mr. Rowe.

This Resolution having been seconded by Mr. Cubitt, was unanimously agreed to.

Mr. BELL then offered a few remarks on the duties of local Committees, after which the proceedings terminated, with a vote of thanks to Mr. Bell, and to the Chairman of the evening.

ORIGINAL AND EXTRACTED ARTICLES.

REPORT UPON ORIGINAL GRAVITIES.

BY PROFESSORS GRAHAM, HOFMANN, AND REDWOOD.

[This Report contains the results of an Investigation undertaken by desire of the Secretary of State. It is addressed to the Chairman of the Board of Inland Revenue.]

The subject of the present inquiry is the specific gravity of the Worts of Beer. When worts are fermented they lose in density, and assume, as beer, a different specific gravity. This last is of course the only true specific gravity of the beer, but the specific gravity of the worts is also named with reference to the beer, as the original specific gravity of the beer, or the Original Gravity of the Beer.

A knowledge of the original gravity of beer is required to fix the drawback allowed upon the beer when exported, according to the terms of 10th Victoria, cap. 5. By this Act a drawback is granted of five shillings per barrel of thirty-six gallons, upon beer exported, of which "the worts used before fermentation were of not less specific gravity than 1.054, and not greater specific gravity than 1.081;" and a drawback of seven shillings and sixpence per barrel upon beer, of which "the worts used before fermentation were not of less specific gravity than 1.081."

The original gravity of beer is directly observed by the brewer only, who ascertains the specific gravity of the worts of each brewing operation by means of the saccharometer, or other form of the hydrometer, and preserves a record of the observation. To enable the revenue officer to arrive independently at the same information, he possesses the beer only from which to infer the specific gravity of the worts. It is the special object of the following investigations to discover how the original gravity of beer may be ascertained most accurately from the properties of the beer itself.

The question has already been examined by foreign chemists—by Otto and Zenneck, and especially by Balling of Prague; as well as by Messrs. Dobson and Phillips of the Department of Inland Revenue, whose previous researches have greatly facilitated the present inquiry.

The same properties of the beer have been generally had recourse to as likely to throw light upon the original gravity of the liquid, and obviously suggest themselves. These are—1°, the specific gravity of the beer itself (the Beer-gravity); 2°, the proportion of alcohol the beer contains (the Spirit-indication of the beer), to be ascertained by distillation and other practical methods; and 3°, the proportion of unfermented solid matter held in solution by the beer (the Extract or Extractive Matter of the beer). The liquid from which the volatile alcohol has been expelled, and which contains the extractive matter, when made up again to the original volume of the beer by the addition of the necessary quantity of water, represents the beer without its spirit; and it is by the greater or less specific gravity of this liquid that the proportion of extract in the beer has been generally estimated. The Extract gravity of the beer is thus obtained.

As the alcohol of the beer is derived from the decomposition of saccharine matter only, and represents approximately double its weight of starch-sugar, a speculative original gravity might be obtained by simply increasing the extract gravity of the beer by that of the quantity of starch-sugar known to be decomposed in the fermentation. The inquiry would then reduce itself to the best means of ascertaining the two experimental data, namely, the extract gravity and the proportion of alcohol in the beer, particularly of the latter. It would be required to decide whether the alcohol should be determined from the gravity of the spirits distilled from the beer; by the increased gravity of the beer when its alcohol is evaporated off; by the boiling point of the beer, which is lower the larger the proportion of alcohol present; or by the refracting power of the beer upon light—various methods recommended for the valuation of the spirits in beer.

Original gravities so deduced, however, are found to be useless, being in error and always under the truth, to an extent which has not hitherto been at all accounted for. The theory of brewing, upon a close examination of the process, proves to be less simple than is implied in the preceding assumption; and other changes appear to occur in worts, simultaneously with the formation of alcohol, which would require to be allowed for before original gravities could be rightly estimated. It was found necessary to study the gravity in solution of each by itself, of the principal chemical substances which are found in fermented liquids. These individual gravities defined the possible range of variation in original gravity, and they brought out clearly for the first time the nature of the agencies which chiefly affect the result.

The use of cane-sugar is now permitted in breweries, and the solution of sugar may be studied first as the wort of simplest composition. The tables of the specific gravity of sugar solutions, constructed by Mr. Bate, have been verified, and are considered entirely trustworthy. The numbers in the first and third columns of Table I., which follows, are, however, from new observations. It is to be remarked that these numbers have all reference to weights and not to measures. A solution of cane-sugar, which contains 25 grains of sugar in 1000 grains of the fluid, has a specific gravity of 1010.1, referred to the gravity of pure water taken as 1000; a solution of 50 grains of cane-sugar in 1000 grains of the fluid, a specific gravity of 1020.2, and so on. The proportion of carbon contained in the sugar is expressed in the second column; the numbers being obtained from the calculation that 171 parts by weight of cane-sugar (C_{12} H_{11} O_{11}) consist of 72 parts of carbon, 11 parts of hydrogen, and 88 parts of oxygen; or of 72 parts of carbon combined with 99 parts of the elements of water. It is useful to keep thus in view the proportion of carbon in sugar solutions, as that element is not involved in several of the changes which precede or accompany the principal change which sugar undergoes during fermentation, and which changes only affect the proportion of the oxygen and hydrogen, or elements of water, combined with the carbon. The proportion of oxygen and hydrogen in the altered sugar increases or diminishes during the changes referred to; but the carbon remains constant, and affords, therefore, a fixed term in the comparison of different solutions.

TABLE I.

Specific Gravity of Solutions of CANE-SUGAR in Water.

Cane-Sugar, in 1000 parts by weight.	Carbon, in 1000 parts by weight.	Specific Gravity.
25	10.53	1010.1
50	21.05	1020.2
75	31.58	1030.2
100	42.10	1040.6
125	52.63	1051
150	63.16	1061.8
175	73.68	1072.9
200	84.21	1083.8
225	94.73	1095.2
250	105.26	1106.7

When yeast is added to the solution of cane-sugar in water, or to any other saccharine solution, and fermentation commenced, the specific gravity is observed to fall, owing to the escape of carbonic acid gas, and the formation of alcohol which is specifically lighter than water; 171 grains of sugar, together with 9 grains of water, being converted into 92 grains of alcohol and 88 grains of car-

bonic acid (C_{12} H_{11} O_{11}+HO = 2 C_4 H_6 O_5+4 CO_2). But if the process of fermentation be closely watched, the fall of gravity in cane-sugar will be found to be preceded by a decided increase of gravity. Solutions were observed to rise from 1055 to 1058, or 3 degrees of gravity, within an hour after the addition of the yeast, the last being in the usual proportion for fermentation. When the yeast was mixed in minute quantity only, such as 1-300dth of the weight of the sugar, the gravity of the sugar solution rose gradually in four days from 1055 to 1057.91, or also nearly 3 degrees; with no appearance, at the same time, of fermentation or of any other change in the solution. This remarkable increase of density is owing to an alteration which takes place in the constitution of the cane-sugar, which combines with the elements of water and becomes starch-sugar, a change which had been already proved by H. Rose and by Dubrunfaut to precede the vinous fermentation of cane-sugar. The same conversion of cane-sugar into starch-sugar, with increase of specific gravity, may be shown by means of acids as well as of yeast. A solution of 1000 parts of cane-sugar in water, having the specific gravity 1054.64, became with 1 part of crystallized oxalic acid added to it 1054.7; and being afterwards heated for twenty-three hours to a temperature not exceeding 128° Fahr., it was found (when cooled) to have attained a gravity of 1057.63—an increase again of nearly 3 degrees of gravity.

In the table of starch-sugar, which follows, the influence of this conversion upon specific gravity is shown by placing together the gravities of cane-sugar and of the starch-sugar into which it is convertible, and which therefore contain equal quantities of carbon.

Table II.

Comparison of the Specific Gravities of Solutions of Cane-Sugar and Starch-Sugar containing equal quantities of Carbon.

Cane-Sugar contained in 1000 parts by weight of Solution.	Specific gravity of Solution of Cane-Sugar.	Specific gravity of Solution of Starch-Sugar.
25	1010.1	1010.4
50	1020.2	1020.8
75	1030.2	1031.3
100	1040.6	1042.4
125	1051	1053.5
150	1061.8	1064.9
175	1072.9	1076
200	1083.8	1087.8
225	1095.2	1099.4
250	1106.7	1111.4

When yeast is added to a solution of starch-sugar, or of cane-sugar previously converted by means of oxalic acid or by yeast itself into starch-sugar, the rise of gravity described is no longer observed to precede fermentation. Hence the irregularity does not appear in an infusion of malt, which contains starch-sugar, and the attenuation of malt worts commences with the first action of the yeast and advances without interruption till the fermentation is completed.

It is already evident from these statements that the original gravity of a fermented liquid or beer must be different, according as it was derived from a wort of cane-sugar or of starch-sugar.

A comparison was next made of the specific gravities of solutions of Pale and of Brown Malt with the solutions of the two pure sugars. The carbon, determined by actual combustion in organic analysis, is the same in all the four solutions, of which the gravities are given in the same line, and is the proportion which exists in 25, 50, 75, &c., parts of cane-sugar, as in Table I.

Table III.

Specific Gravity of Solutions of Pale Malt, Brown Malt, and Starch-Sugar, containing equal quantities of Carbon.

Solution of Pale Malt.	Solution of Brown Malt.	Solution of Starch-Sugar.	Parts of Cane-Sugar corresponding, in 1000 parts by weight of Solution.
1010.0	1010.0	1010.4	25
1020.3	1020.2	1020.8	50
1030.6	1030.6	1031.3	75
1041.2	1041.2	1042.4	100
1052.1	1052.0	1053.5	125
1063.0	1062.9	1064.9	150
1074.2	1074.0	1076.0	175
1085.5	1085.5	1087.8	200
1097.2	1097.2	1099.4	225
1109.0	1109.0	1111.4	250

It is interesting to observe how closely the gravities of the pale and brown malt agree together through the whole range of the Table. The gravities are often identical and in no case differ more than 0.2 degree. This indicates a greater uniformity of density in the worts of different varieties of malt than could have been anticipated, and it gives a character of constancy to the density of malt wort which is highly satisfactory.

The density of the malt worts also approaches that of the pure starch-sugar, but is always a little less by about 1 degree of gravity in 35. Malt wort appears, indeed, intermediate between the two pure sugars. We have, for instance, solutions containing an equal quantity of carbon, which exhibit the following gravities:—

Cane-Sugar	1072.9
Pale Malt	1074.2
Starch-Sugar	1076.0

Now, if the whole carbon of malt wort were present in the form of starch-sugar, the gravity of the wort should somewhat exceed that of the pure starch-sugar solution, as a small proportion of alkaline and earthy salts exist in the malt infusion, and must add to its gravity. The carbon present in the small quantity of albumen of the malt could not affect the result materially in either way.

But there are two other substances related to sugar, of which the interference in malt infusions may be anticipated, namely, Dextrin, or the gum of starch, and Caramel. These are both forms of the sugar principle, the transition from the one condition to the other depending upon the fixation of the elements of water in the substance, or the liberation of a proportion of water. Observations were in consequence made of the gravities of pure solutions of dextrin prepared from starch, and of caramel produced by the proper application of heat to sugar.

TABLE IV.

Specific Gravities of Solutions of CARAMEL, DEXTRIN, and STARCH-SUGAR, containing equal quantities of CARBON.

Solution of Caramel.	Solution of Dextrin.	Solution of Starch-Sugar.	Parts of Cane-Sugar corresponding, in 1000 parts by weight of Solution.
1008.7	1009.7	1010.4	25
1017.3	1019.3	1020.8	50
1026.2	1028.8	1031.3	75
1034.9	1038.3	1042.4	100
1043.8	1047.9	1053.5	125
1052.8	1057.3	1064.9	150
1062.3	1066.9	1076.0	175
1071.8	1076.6	1087.8	200
1081.3	1086.3	1099.4	225
1091.0	1095.8	1111.4	250

It will be observed that the gravities of both caramel and dextrin are considerably less than those of starch-sugar, and that consequently the presence of either of these substances, taking the place of starch-sugar in a malt infusion, must lower the specific gravity of the latter. The following solutions of the three different substances, containing the same quantity of carbon, appear by the Table to have different gravities:—

Starch-Sugar 1076
Dextrin 1066.9
Caramel 1062.3

The solution of cane-sugar containing the same quantity of carbon, has the specific gravity 1072.9, and contains 175 grains of cane-sugar in 1000 grains of the solution, or 17.5 per cent. of cane-sugar. It follows that this proportion of the saccharine principle may present itself with specific gravities varying from 1076 to 1062.3, in the different forms which it can assume. A certain quantity of dextrin generally exists in the wort of malt, which may be thrown down by alcohol. Dextrin was prepared in a pure state from this source. Its presence is, of course, due to the incomplete saccharization of the starch of the malt in the process of mashing.

With regard to the existence of the other substance, caramel, in malt infusions, the extreme facility with which starch-sugar is altered by heat, would lead us to look for the production of caramel in the kiln-drying of malt, particularly of brown malt. Its production is indicated by the dark colour of the infusion of the highly dried malt. Of the 3 or 4 per cent. of black malt used for colouring porter, the whole soluble portion appears also to be caramel. It may be further added, that the use of caramel prepared from sugar, as a colouring ingredient of porter, is now permitted in breweries.

A substance resembling caramel in some of its properties is developed in fermented liquids in another way. The saccharine matter of the wort is never wholly converted into carbonic acid and alcohol in the most favourable circumstances, a portion of solid matter always remaining, which is no further fermentable even after the alcohol is distilled off and fresh yeast applied. This residuary matter is generally spoken of as a gummy substance, but when obtained by the fermentation of pure sugar it partakes more of the characters of caramel, or of glucic acid, particularly in the low gravity of its solution in water. Of pure cane-sugar fermented, 4.4, 3.72, and 3.7 per cent. was converted into this substance in three fermentations, in which one and a half, three, and six measures of yeast were employed to one hundred measures of solution, containing one-seventh of its weight of sugar.

The extractive substance resembling caramel was obtained in the form of a dark brown syrup, by evaporating the liquid after fermentation had entirely ceased. It reddened litmus paper, contained lactic acid, and was distinctly sour and slightly bitter to the taste. That this residuary substance contained no longer any starch-sugar, appeared from the fact, that on mixing its diluted solution with caustic potash and heating it, the colour was not sensibly darkened. It was no longer fermentable by yeast, and it did not become so (like dextrin) after being boiled with sulphuric acid. It resembled caramel in giving with sulphate of copper and caustic potash in excess a transparent blue solution, from which suboxide of copper was thrown down on the application of heat. It is precipitated by baryta water, and gives with subacetate of lead a brown precipitate, which, however, is more voluminous and paler in colour than the precipitate from pure caramel. Neutral acetate of lead precipitates a portion only of this substance, proving that it is not a single principle but a mixture of two or more substances.

A solution of it compared with that of caramel, obtained by heating cane-sugar to 410° Fahr., and both containing the same proportions of carbon, gave very similar densities.

TABLE V.

Specific Gravities of Solutions of CARAMEL from CANE-SUGAR, and of the Extractive Substance from the Fermentation of SUGAR, containing equal quantities of CARBON.

Solution of Caramel.	Solution of Extractive Substance.	Parts of Cane-Sugar corresponding, in 1000 Parts by weight of Solution.
1008.7	1008.9	25
1017.3	1017.8	50
1026.2	1026.5	75
1034.9	1035.5	100
1043.8	1044.7	125
1052.8	1053.9	150
1062.3	1063.0	175
1071.8	1072.7	200
1081.3	1082.3	225

This Extractive substance appears to interfere more than dextrin in giving lightness or apparent attenuation to fermented worts, without a corresponding production of alcohol. Its effect becomes the more sensible the more nearly the worts are exhausted by fermentation. It is produced in the fermentation of both kinds of sugar and also of malt. There appears to be a certain uniformity in the proportion of saccharine matter which undergoes this change in every brewing, judging from the correspondence of different beers in their gravities, at the same stage of fermentation, which shall afterwards be exhibited. It causes a marked irregularity in the progression of the gravities when the fermentation is carried to an extreme, as it is in distilleries; but in brewing beer the fermentation is always arrested at a point in its progress too early to allow the effect of the Extractive substance upon the gravity to become very conspicuous.

The indication by gravity of the Extractive substance is so much lower than that of starch-sugar, that the former substance only indicates about five-

sixths of the saccharine principle which has given rise to it. Hence it is that original gravities cannot be calculated on the assumption that the solid matter in beer is sugar, or a substance having the same gravity as sugar.

In the maturation of beer by time, an increase of attenuation is observed, which is no doubt chiefly due to the slow continuation of the vinous fermentation, with the disappearance of sugar and formation of alcohol; but there is some reason to believe that the attenuation is not entirely due to that cause. Part of the loss of gravity appears to be occasioned by the change in condition of the saccharine principle from that of starch-sugar to the condition of the Extractive-substance, a change which involves a loss of specific gravity without a corresponding production of alcohol.

Another constituent of malt wort, which should not be omitted, is the soluble azotized or albuminous principle derived from the grain. The nitrogen was determined in a strong wort of pale malt with hops, of the specific gravity 1088, and containing about twenty-one per cent. of solid matter. It amounted to 0.217 per cent. of the wort, and may be considered as representing 3.43 per cent. of albumen. In the same wort, after being fully fermented, the nitrogen was found to amount to 0.134 per cent., equivalent to 2.11 per cent. of albumen. The loss observed of nitrogen and albumen may be considered as principally due to the production and growth of yeast, which is an insoluble matter, at the cost of the soluble albuminous matter. Solutions of egg-albumen in water, containing 3.43 and 2.11 per cent. respectively of that substance, were found to have the specific gravities 1004.2 and 1003.1. Hence a loss of density has occurred during fermentation of 1.1 degree on a wort of 1088 original gravity, which can be referred to a change in the proportion of albuminous matter. It will be observed that the possible influence of this substance and of the greater or less production of yeast during fermentation, upon the gravity of beer, are restricted within narrow limits.

The mineral constituents of the same worts, consisting of soluble salts of the earths and alkalies, amounted before fermentation to 0.443 per cent., and after fermentation to 0.463. The proportion of these substances may therefore be supposed to remain constant.

The process required for the determination of the original gravity of beer, must be easy of execution and occupy little time. It is not proposed, in the examination of a sample, to separate by chemical analysis the several constituents which have been enumerated. In fact, we are practically limited to two experimental observations on the beer, in addition to the determination of its specific gravity.

One of these is the observation of the amount of solid or extractive matter still remaining after fermentation, which is always more considerable in beer than in the completely fermented wash of spirits. A known measure of the beer might be evaporated to dryness, and the solid residue weighed, but this would be a troublesome operation, and could not indeed be executed with great accuracy. The same object may be attained with even a more serviceable expression for the result, by measuring exactly a certain quantity of the beer, such as four fluid ounces, and boiling it down to somewhat less than half its bulk in an open vessel, such as a glass flask, so as to drive off the whole alcohol. The liquid when cool is made up to four fluid ounces, or the original measure of the beer, and the specific gravity of this liquid is observed. It has already been referred to as the Extract gravity of the beer, and represents a portion of the original gravity. Of a beer of which the history was known, the original gravity of the malt wort was 1121, or 121 degrees; the specific gravity of the beer itself before evaporation, 1043; and the Extract gravity of the beer 1036.7, or 36.7 degrees.

The second observation which can be made with sufficient facility upon the beer, is the determination of the quantity of alcohol contained in it. This information may be obtained most directly by submitting a known measure of

the beer to distillation, continuing the ebullition till all the alcohol is brought over, and taking care to condense the latter without loss. It is found in practice that four ounce-measures of the beer form a convenient quantity for the purpose. This quantity is accurately measured in a small glass flask, holding 1750 grains of water when filled up to a mark in the neck. The mouth of the small retort containing the beer is adapted to one end of a glass tube-condenser, the other end being bent and drawn out for the purpose of delivering the condensed liquid into the small flask previously used for measuring the beer. The spirituous distillate should then be made up with pure water to the original bulk of the beer, and the specific gravity of the last liquid be observed by the weighing bottle, or by a delicate hydrometer, at the temperature of 60° Fahr. The lower the gravity the larger will be the proportion of alcohol, the exact amount of which may be learned by reference to the proper tables of the gravity of spirits. The spirit-gravity of the beer already referred to, proved to be 985.95; or it was 14.05 degrees of gravity less than 1000 or water. The "spirit-indication" of the beer was therefore 14.05 degrees; and the extract gravity of the same beer 36.7 degrees.

The spirit-indication and extract gravity of any beer being given, do we possess data sufficient to enable us to determine with certainty the original gravity? It has already been made evident that these data do not supply all the factors necessary for reaching the required number by calculation.

The formation of the Extractive matter, which chiefly disturbs the original gravity, increases with the progress of the fermentation; that is, with the proportion of alcohol in the fermenting liquor. But we cannot predicate from theory any relation which the formation of one of these substances should bear to the formation of the other, and are unable, therefore, to say beforehand that because so much sugar has been converted into alcohol in the fermentation, therefore so much sugar has also been converted into the Extractive substance. That a uniform, or nearly uniform relation, however, is preserved in the formation of the spirits and Extractive substance, in beer-brewing, appears to be established by the observations which follow. Such an uniformity in the results of the vinous fermentation is an essential condition for the success of any method whatever of determining original gravities, at least within the range of circumstances which affect beer-brewing. Otherwise two fermented liquids of this class, which agree in giving both the same spirit-indication and the same extractive gravity, may have had different original gravities, and the solution of our problem becomes impossible.

The fermentation of liquids of known composition and original gravity, containing pure cane-sugar, pure starch-sugar, and the soluble matter of malt, the latter both with and without hops, was now repeated and the wort examined in each fermentation at ten or twelve different stages of its progress, or after short periods of a few hours. The two required observations of the spirit-indication and extract-gravity were made on every occasion, with certain additional observations which shall again be referred to.

The details of these and the numerous other fermentations referred to, were conducted, under our directions, by Mr. Adam Young and Mr. C. B. Forsey, officers of Inland Revenue, and lately of the Birkbeck Laboratory, to whom we have great pleasure in acknowledging our obligations for the valuable aid which a perfect acquaintance with the subject and remarkable skill in experimenting, combined with the most untiring zeal, could supply.

The results of a particular fermentation of cane-sugar may be stated. Fifteen and a half pounds of refined sugar were dissolved in ten gallons of water, making 10¾ gallons of solution, of which the specific gravity was 1055.3 at 60°; and after adding three fluid pounds of fresh porter yeast, the specific gravity was 1055.95. The original gravity may be taken as 1055.3 (55.3 degrees).

Fermentation of Sugar-Wort of Original Gravity 1055.3.

I. Number of Observation.	II. Period of Fermentation.	III. Degrees of Spirit-Indication.	IV. Degrees of Extract Gravity.	V. Degrees of Extract Gravity *lost*.
	Days. Hours.			
1	0 0	0.	55.30	0.
2	0 6	1.59	52.12	3.18
3	0 12	2.57	47.82	7.48
4	0 19	3.60	43.67	11.63
5	0 23	4.33	40.13	15.17
6	1 5	5.31	35.50	19.80
7	1 12	6.26	31.59	23.91
8	1 19	7.12	27.63	27.67
9	2 11	8.59	20.26	35.04
10	3 11	9.87	13.40	41.90
11	5 12	10.97	7.60	47.70
12	6 12	11.27	4.15	51.15

Columns III. and V. respectively exhibit the spirit which has been produced and the solid matter which has disappeared; the first in the form of the gravity of the spirit, expressed by the number of degrees it is lighter than water, or under 1000, and the second by the fall in gravity of the solution of the solid matter remaining below the original gravity 1055.3. This last value will be spoken of as "degrees of gravity lost;" it is always obtained by subtracting the extract gravity (column IV.) from the known original gravity. To discover whether the progress of fermentation has the regularity ascribed to it, it was necessary to observe whether the same relation always holds between the columns of "degrees of spirit-indication" and "degrees of gravity lost." It was useful, with this view, to find what degrees of gravity lost corresponded to whole numbers of degrees of spirit-indication. This can be done safely from the preceding Table, by interpolation, where the numbers observed follow each other so closely. The corresponding degrees of spirit-indication and of gravity lost, as they appear in this experiment upon the fermentation of sugar, are as follows:—

Fermentation of Sugar-Wort, of Original Gravity 1055.3.

Degrees of Spirit Indication.	Degrees of Extract Gravity lost.
1	1.71
2	4.74
3	9.26
4	13.48
5	18.50
6	22.54
7	27.01
8	31.87
9	37.12
10	42.55
11	47.88

In two other fermentations of cane-sugar, the degrees of gravity lost, found to correspond to the degrees of spirit-indication, never differed from the numbers of the preceding experiment, or from one another, more than 0.9 degree of gravity lost. This is a sufficiently close approximation.

Fermentation of Sugar-Wort of Original Gravity 1054.7, A; and of Sugar-Wort of Original Gravity 1028.8, B.

Degrees of Spirit-Indication.	Degrees of Extract Gravity lost.	
	A.	B.
1	2.01	1.94
2	5.15	4.84
3	9.22	9.90
4	13.95	14.10
5	18.09	18.31
6	23.16	22.61
7	27.05	27.51
8	32.26	
9	37.40	
10	42.16	
11	47.56	

The observations of the three experiments were combined in the following Table, which exhibits the mean results. Besides the degrees of gravity lost corresponding to whole degrees of spirit-indication, the degrees of gravity lost corresponding to tenths of a degree of spirit-indication are added from calculation.

Table VI.—Cane-Sugar.

Degrees of Spirit-indication with corresponding Degrees of Gravity lost.

Degrees of Spirit-Indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	—	.2	.3	.5	.7	.9	1.0	1.2	1.4	1.6
1	1.9	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.6
2	5.0	5.4	5.8	6.2	6.6	7.0	7.5	8.0	8.5	9.0
3	9.5	9.9	10.3	10.7	11.2	11.6	12.0	12.4	12.8	13.3
4	13.8	14.2	14.6	15.0	15.5	15.9	16.3	16.7	17.2	17.7
5	18.3	18.7	19.1	19.5	19.9	20.3	20.8	21.2	21.7	22.2
6	22.7	23.1	23.5	23.9	24.4	24.7	25.2	25.6	26.1	26.6
7	27.1	27.6	28.1	28.6	29.1	29.6	30.0	30.5	31.0	31.5
8	32.0	32.5	33.0	33.5	34.0	34.5	35.0	35.5	36.0	36.6
9	37.2	37.7	38.2	38.7	39.2	39.7	40.3	40.8	41.3	41.8
10	42.4	42.9	43.4	44.0	44.5	45.0	45.6	46.1	46.6	47.2
11	47.7									

It is seen from this Table that for 5 degrees of spirit-indication, the corresponding degrees of gravity lost are 18.3 degrees. For 5.9 degrees of spirit-indication, the corresponding degrees of gravity lost are 22.2 degrees.

This Table is capable of a valuable application, for the sake of which it was constructed. By means of it, the unknown original gravity of a fermented liquid, or beer, from cane-sugar, may be discovered provided the spirit-indication and extract gravity of the beer are observed. Opposite to the spirit-indication of the beer in the Table we find the corresponding degrees of gravity lost, which last added to the extract gravity of the beer give its Original Gravity.

Suppose the sugar-beer exhibited an extract gravity of 7.9 degrees (1007.9) and spirit-indication of 11 degrees. The latter marks, according to the Table, 47.7 degrees of gravity lost, which, added to the observed extract gravity, 7.9 degrees, gives 55.6 degrees of original gravity for the beer (1055.6).

The Table which follows was constructed in the same manner for Starch-sugar, from two fermentations of the pure substance, and gives the means of calculating the original gravity of liquids fermented from starch-sugar, when the spirit-indication and extract gravity of the beer are known from experiment. The extreme deviation between the two series of observations was 0.8 degree of gravity lost.

TABLE VII.—STARCH-SUGAR.

Degrees of Spirit-indication with corresponding Degrees of Gravity lost.

Degrees of Spirit-indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	—	.3	.6	.9	1.2	1.5	1.8	2.1	2.4	2.7
1	3.0	3.3	3.7	4.0	4.4	4.7	5.0	5.4	5.8	6.2
2	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.3
3	10.7	11.1	11.5	12.0	12.4	12.9	13.3	13.7	14.1	14.5
4	15.0	15.4	15.9	16.4	16.8	17.3	17.7	18.2	18.7	19.2
5	19.7	20.1	20.6	21.0	21.5	22.0	22.5	23.0	23.5	24.0
6	24.5	25.0	25.4	25.9	26.4	26.8	27.3	27.8	28.3	28.8
7	29.3	29.7	30.2	30.7	31.1	31.6	32.0	32.5	33.0	33.5
8	34.0	34.5	35.0	35.5	36.0	36.5	37.0	37.5	38.0	38.5
9	39.0	39.5	40.1	40.6	41.1	41.7	42.2	42.8	43.3	43.9
10	44.5	45.1	45.8	46.5						

The numbers will be observed to differ from those of the preceding Table for cane-sugar, and to be all greater, the differences increasing pretty uniformly with the higher degrees of spirit-indication. The corresponding numbers for 10 degrees of spirit-indication are 42.4 in cane-sugar and 44.5 in starch-sugar, or a difference of 2.1 degrees of gravity lost. By this difference the original gravity of the beer of starch-sugar is increased over that of cane-sugar, as should be the case; the specific gravity of starch-sugar being always higher than that of cane-sugar containing an equal weight of carbon, and capable of yielding an equal quantity of spirits. (See Table II.)

The three Tables for Malt worts of different kinds which follow will be found to agree well with each other, and also to accord closely with the preceding Table for pure starch-sugar worts.

TABLE VIII.—PALE MALT WITHOUT HOPS.

Degrees of Spirit-indication with corresponding Degrees of Gravity lost.

Degrees of Spirit-indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	—	.3	.6	.9	1.2	1.5	1.8	2.2	2.5	2.8
1	3.2	3.6	3.9	4.3	4.6	5.0	5.4	5.8	6.2	6.6
2	7.0	7.4	7.8	8.2	8.6	8.9	9.4	9.8	10.3	10.7
3	11.2	11.6	12.1	12.6	13.0	13.4	13.8	14.2	14.6	15.0
4	15.5	15.9	16.4	16.9	17.3	17.7	18.1	18.6	19.1	19.5
5	20.0	20.5	20.9	21.3	21.8	22.2	22.7	23.1	23.6	24.1
6	24.6	25.0	25.5	25.9	26.3	26.8	27.3	27.8	28.3	28.8
7	29.3	29.7	30.2	30.7	31.2	31.7	32.2	32.7	33.2	33.7
8	34.2	34.7	35.2	35.7	36.3	36.9	37.5	38.1	38.6	39.1
9	39.5	40.0	40.5	41.0						

The results given are the means of the observations of two fermentations of pale malt without hops, which accorded throughout within one degree of gravity.

TABLE IX.—PALE MALT WITH HOPS.

Degrees of Spirit-indication with corresponding Degrees of Gravity lost.

Degrees of Spirit Indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	—	.2	.5	.7	1.0	1.3	1.6	1.9	2.2	2.5
1	2.8	3.1	3.4	3.7	4.0	4.4	4.8	5.2	5.5	5.9
2	6.3	6.7	7.1	7.5	8.0	8.4	8.8	9.2	9.6	10.0
3	10.5	10.9	11.3	11.8	12.2	12.7	13.1	13.6	14.0	14.5
4	15.0	15.4	15.8	16.3	16.7	17.1	17.6	18.0	18.5	19.0
5	19.5	19.9	20.4	20.9	21.3	21.7	22.2	22.7	23.1	23.5
6	23.9	24.4	24.8	25.3	25.7	26.2	26.6	27.0	27.4	27.9
7	28.4	28.9	29.4	29.9	30.4	30.8	31.2	31.7	32.2	32.7
8	33.2									

The results are the means of the observations of two fermentations of pale malt with hops, which corresponded throughout within 0.49 degree of gravity lost.

TABLE X.—BROWN AND PALE MALT—EQUAL WEIGHTS.

Degrees of Spirit-indication with corresponding Degrees of Gravity lost.

Degrees of Spirit-Indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	—	.3	.6	.9	1.2	1.5	1.8	2.1	2.4	2.8
1	3.1	3.4	3.7	4.0	4.3	4.7	5.1	5.5	5.9	6.2
2	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.2
3	10.5	10.8	11.3	11.7	12.2	12.6	13.0	13.5	13.9	14.0
4	14.8	15.2	15.6	16.1	16.5	17.0	17.4	17.8	18.2	18.6
5	19.0	19.4	19.8	20.2	20.6	21.0	21.5	22.0	22.5	23.0
6	23.5	23.9	24.4	24.9	25.4	25.9	26.4	26.9	27.4	27.9
7	28.2	28.7	29.2	29.8	30.3	30.8	31.3	31.9	32.4	32.9
8	33.5	34.2	34.9	35.8						

This Table was derived from a single experiment. No observation could be made upon brown malt alone, as it could not be fully fermented without a considerable admixture of pale malt.

For comparison, the numbers corresponding to the integral degrees of spirit-indication of the five different Tables are placed together in the following Table:—

TABLE XI.—VARIOUS WORTS.

Degrees of Spirit-indication with corresponding Degrees of Gravity lost.

Degrees of Spirit-Indication.	I. Cane-Sugar.	II. Starch-Sugar.	III. Pale Malt.	IV. Pale Malt with Hops	V. Brown and Pale Malt.	VI. Mean of ii. iii., iv., & v.
1	1.9	3.0	3.2	2.8	3.1	3.0
2	5.0	6.6	7.0	6.3	6.6	6.6
3	9.5	10.7	11.2	10.5	10.5	10.7
4	13.8	15.0	15.5	15.0	14.8	15.1
5	18.3	19.7	20.0	19.5	19.0	19.5
6	22.7	24.5	24.6	23.9	23.5	24.1
7	27.1	29.3	29.3	28.4	28.2	28.8
8	32.0	34.0	34.2	33.2	33.5	33.9
9	37.2	39.0	39.5	...	...	39.25
10	42.4	44.5	...	...	...	44.5
11	47.7		...	...	...	

The first point which excites attention is the general similarity of all the four columns which refer to liquids containing the same fermentable substance, starch-sugar. In comparing together columns II. and III., those of starch sugar itself and pale malt without hops, the greatest difference observed between any two corresponding numbers is 0.5, or half a degree of gravity. The numbers of the two columns are the same at one point, but at all other places the starch-sugar column is slightly exceeded by the pale malt column. It thus appears that the phenomena of the fermentation of pale malt are closely represented by a solution of pure starch-sugar. The other substances besides sugar, of which small quantities are known to be present in malt, appear therefore not to be subjected to any change during the fermentation of the wort, which materially affects the gravity of the latter. The addition of hops to the malt has a slight effect in lowering the gravity numbers, as seen in column IV., to the extent at one point of 1 degree of gravity. Brown malt appears to act in the same direction as hops upon the progression of gravities (column V.) but with less effect, although the quantity of the former was made as large in the experiment as was consistent with fermentation, and much greater than is ever employed by the brewer. The general mean of these four liquids, all containing starch-sugar, appears in column VI.

The highest degree of original gravity which the sugar solutions and malt infusions of the preceding Tables possessed before fermentation, was about 1057, but it was desirable to extend the observations to worts of higher gravities. Pale malt worts with hops, which, representing beer, are of most interest, were fermented: they had in two experiments the original gravity 1087.9, and in one experiment the gravity 1121, and were frequently examined at different stages, as before, till all fermentation ceased. The three experiments gave numbers which did not diverge anywhere during their common range more than 0.7 degree of gravity, and at the same time were in harmony with the earlier experiments on pale malt with hops (Table IX.) The mean of the new experiments gave for six degrees of spirit indication, 24.0 degrees of gravity lost, instead of 23.9 degrees, as in Table IX.; and for 7 degrees of spirit indication, 28.7 degrees of gravity lost, in the place of 28.4, as in Table IX.

TABLE XII.—MALT-WORT OF HIGH ORIGINAL GRAVITY WITH HOPS.

Degrees of Spirit-indication with Degrees of Gravity lost.

Degrees of Spirit-Indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0										
1										
2										
3										
4										
5	...	...	...	...	...	...	22.1	22.5	23.0	13.5
6	24.0	24.4	24.9	25.3	25.8	26.2	26.7	27.2	27.7	28.2
7	28.7	29.2	29.6	30.1	30.6	31.1	31.6	32.1	32.6	33.1
8	33.6	34.1	34.7	35.2	35.7	36.2	36.7	37.2	37.7	38.2
9	38.7	39.2	39.8	40.3	40.8	41.3	41.8	42.3	42.8	43.3
10	43.8	44.3	44.9	45.4	45.9	46.4	47.0	47.5	48.0	48.5
11	49.0	49.6	50.1	50.6	51.2	51.7	52.2	52.7	55.3	53.8
12	54.3	54.9	55.4	55.9	56.4	56.9	57.4	57.9	58.4	58.9
13	59.4	60.0	60.5	61.1	61.6	62.2	62.7	63.3	63.8	64.3
14	64.8	65.4	65.9	66.5	67.1	67.6	68.2	68.7	69.3	69.9
15	70.5									

This last Table combined with Table XI., exhibits the relation between the spirits obtained by distillation from beer, and the degrees of gravity which the original wort loses in producing the spirits, through a range of gravity in the wort which ascends from 1000 to 1121. It is given in a complete form as Table A at the end of the Report.

By means of Table A the original gravity of a specimen of beer may therefore be calculated back, and ascertained from the two data which have been specified, namely (1), the degree of spirit-indication which the spirits contained in the beer exhibit, when made up with water to the same measure as the original beer; and (2) the extract gravity of the beer, or the specific gravity of the beer deprived of its spirit, and made up to its original volume with water. A specimen of beer when examined gave the following data:—

Spirit-indication..... 9.9
Extract gravity..... 1044.7

By Table A, 9.9 degrees of spirit-indication represent 43.7 degrees of gravity lost; which, added to 1044.7, the extract gravity of the same beer, make up 1088.4 degrees, the original gravity of the beer.

(To be continued.)

EXAMINATION OF PAVON'S COLLECTION OF PERUVIAN BARKS CONTAINED IN THE BRITISH MUSEUM.

BY JOHN ELIOT HOWARD, ESQ.

(Continued from page 129.)

In order to render more easy of reference some of the facts contained in the preceding portion of this paper, I have prepared the following tables, which will be found to comprehend in a brief space all the remarks I have been able to make on the collection in the British Museum, together with some notice of the specimens of bark collected by Pavon, and now in the possession of M. Delessert at Paris. It will be found that some of the numbers which I have previously given, do not correspond to those in the present table; the explanation of this circumstance (which I hope will not cause much trouble in reference) is to be found in the state in which the specimens were when first examined by Dr. Pereira and myself, since they were then entirely without number or arrangement.† In the course of these investigations, I have been obligingly furnished with the sight of the original lists sent by Pavon. These were three in number, and will be found condensed into one table, in which I have also included a notice of the missing specimens. The numbers have now been attached according to these lists, to the barks in the Museum, so that it will be very easy in future to refer to each specimen. In addition to the contents of these three lists, there are eight packets, of which no account can be given, except that they appear to have been obtained from the same quarter. These are distinguished by numbers with double asterisks. The lists have been placed in the order of the time they were prepared by Pavon; but in the arrangement of the species in each list, the numerical order of the second list has been followed, firstly, because that list is the most complete; secondly, because it is the one given by Mr. Lambert in his *Illustration of the Genus Cinchona*, p. 17, 1821; and lastly, because it corresponds to the numbers given by M. Guibourt (in the 4me edit. of his *Drogues Simples*) and which he must have found attached to the barks.

The observations of Laubert from Tafalla (included in the tables) appear to me of very considerable interest, and these it will be observed I have extracted from a table given at the end of the memoir of M. Laubert, in the *Bulletin de Pharmacie*.

† The numbers inscribed by Pavon on the specimens of wood were fortunately incapable of being lost.

TABULAR ARRANGEMENT OF PAVON'S COLLECTION OF PERUVIAN BARKS CONTAINED IN THE BRITISH MUSEUM.

No. Bark	No. Wood	Vernacular Name according to Pavon.	Description by other Writers.	Botanical Name and Specimens.	English Commerce.	Guibourt's Histoire des Drogues.	Remarks.
1	14	C. vulgo Azaharito de Loxa.	... ...	Cascarilla sienocarpa. Pavon's herbarium in the Museum contains one specimen marked *Cinchona sienocarpa* by Lambert, and by Pavon *C. sp. nov. ex Jaen in montibus Loxa, Quito*	Not met with	Resembles con- *fus amer*, H. D. III., 176.....	The substance hard, white, and like that of a Cascarilla. Like Malambo bark.
2	1	C. cascarilla crespilla de Jaen de Loxa	Cascarilla fina provinciana, y cascarilla crespilla de Jaen (Collection Delessert, Lettre Q).	Cinchona umbelluliféra (Pav. MSS.)	Inferior grey bark	Quinquina de Lima gris brun	Crisp, woody, hard, blackish quills, rather like casc. bonrilla.
3		C. cascarilla fina de Loxa ...	"Has some resemblance to Secmann's specimen, but is not quite so bright."—P. "Omnium pressatas." De Cand., Prod. IV., 352	Cinchona Condaminea, *a* vera (Weddell)..... The Urtusinga variety	Fine Loxa, containing "Silver crown" and "Leopard crown" bark	... ...	Thirteen chests of this out of 613 packages from Payta and Lima, in a recent sale.
4	25	C. cascarilla de Quiebro de Cuenca de Loxa (*Quiebro*, a ravine)	... ...	Cinchona macrocalyx (Pav.) *β* Candolli (Weddell). One specimen in the Museum differs much from the specimen of *β* Candolli, marked *Q. sagra de Azogues*, in J. E. H.'s collection	Inferior Loxa	Q. de Loxa jaune fibreux de commerce actuel. H.D. III., 196	The cross cracks are feebly impressed; the bark generally smooth and flexible.
5	24	C. cascarilla Tarontaron de Loxa	C. rosea (R. & P.) cascarillo pardo (Ruiz, *Quinologia*,77) *Aszmoxich*, in Peru	Lasiocnema roseum (Weddell)	Not met with.	... ...	Missing.
6	19	C. cascarilla Puchon de Loxa.	"Cinchona quina Puchon de Loxa," and "C. casc. Puchon de Jaen" on the envelope	Some resemblance to C. Australis (Weddell).....	... ...	... ...	"A pale, gouty-jointed, white-quilled bark." Pereira.
7		C. cascarilla Flor. de Azahar	See No. 38	Cascarilla magnifolia (Weddell)	Very rare in this form	H. D., III., 163	Small quill, with greenish white parchment epidermis.
8		C. rosea del Peru	... ...	Lasiocnema roseum (Weddell)	Unknown.....	Ecorce d'Asmonich, H.D., III., 171.	Rusty brown chips.
9	26	C. con hojas rugosas de Loxa	C. Con hojas rugosas. Fol. ovatis integerrimis, rugosis (Laubert & Tafalla)	Cascarilla crespilla con hojas rugosas de Loja. Cinchona parabolica (J. Collection Delessert.) C. Mutisii *β* crispa (Weddell)	Ditto	Quinquina payasma de Loxa. H.D., III., 159	Extremely fibrous bark, resembles No. 15.
10	28	C. con hojas de Lucuma de Loxa, 1ª especie.....	Follis Lucumæ, capsulis ovatis. (Laubert & Tafalla)	Cinchona Condaminea, γ lucumæfolia	A kind of crown bark	... ...	Fine large quills, red substance.
11	8	C. Quina crespilla de Loxa ...	Fol. subrotundo-ovatis, margine undulato-convexis, floribus intus dilute roseis (Laubert & Tafalla)	Bark missing in the collection	Grey Loxa	Quinquina de Loxa prismatique. H. D., III., 161.	
12	12	C. margarita de Loxa	... ...	Cascarilla magnifolia (var. ?).....	Unknown.....	... ...	A brown red bark, with epidermis like parchment.
13	15	C. con hojas de Roble de Loxa	Fol. ovatis, rugosis, minoribus (Laubert & Tafalla) C. quercifolia (Pavon, MSS.)	Cinchona Mutisii, *a* microphylla (Weddell). Two specimens, "casc. sp. nova tandilla de Loxa." Marked by Lambert C. Mutisii ...	Ditto	*Vide* Q. payama de Loxa.....	Resembles C. amygdalifolia. (Compare No. 9.)
14		C. laccifera del Peru, parecida a la roxa de Mutis	Discovered by Tafalla—vulgo Socchi	Condaminea tinctoria, D. C. (Guibourt. H. D., iii., 74)	Came in a small quantity in 1851	Ecorce de Paragustan. H.D., III., p 167	A madder pink bark sent to Europe first in 1798. It differs from the roxa of Mutis.
15	29	C. azahar macho de Loxa ...	The bark is labelled "Quina azahar macha."	Cascarilla Riverœana, Weddell, var. *a*. One specimen marked by Pavon "*red bark, Cinchona oblongifolia Mutis*;" by Lambert (?) "*not of Mutis*"	Ditto	H. D. III., 163. (Foot note.) ...	Colour black-purple, otherwise like the *hembra*.
16	3	C. pata de Gallinazo, vulgo de Loxa. 2ª especo de Loxa	"Follis ovatis, acuminatis, capsulis sanguineis (Laubert & Tafalla)	Cinchona subcordata, Pavon. In the collection Delessert (D.) C. ovata (Weddell).....	Inferior fibrous pale bark	Quinquina blanc de Loxa. H. D. III., 155	"Approaches to oak bark, but when the finger is passed over, feels rough like a fine sand-paper." Pereira. The substance of the bark brown, *Stricta aurata* and Parmelia melanoleuca adherent.
17	32	C. Provinciana, vulgo de Loxa (See *33, *18).....	"The C. Provinciana of Cacherodiffers from that of Huanuco by its strikingly whiter colour and rougher surface. It is thicker and more woody, the fracture more fibrous, the colour cinnamon brown."—Poeppig	Cinchona micrantha (R. & P.) variat. *a* flor. extus roseis, *β* flor. extus albidis (Poeppig).....	Coarse Huanuco bark	Q. Huanuco ou Quinquina gris de Lima. H. D., III., 160	Greenish, wrinkled Huanuco bark.
18 *39	9	C. Azahar, hembra, vulgo de Jaen de Loxa	The C. oblongifolia of *Lambert* according to Weddell, Histoire, &c., p. 83.	Cascarilla Riverœana (var. *β* Weddell)	Unknown.....	H. D., III., 163.....	Resembles Cascarilla acutifolia.
19	7	C. cascarilla crespilla ahumada de Loxa	Fol. obovatis, nervosis, rugosis (Laubert & Tafalla).....	Cinchona pubescens, *β* purpurea "*? folia, rarius subrotunda*" (Weddell).	A quantity sold to pay dock charges in 1848	Gris pale ancien	*Ahumada* (smoky) bark with coarse fibre and greenish epidermis.
20	32	C. cascarilla colorada de Jaen de Loxa	R. Cascarilla colorada de Loja, de la Provincia de Jaen (Collection Delessert)	Cinchona conglomerata, Pavon (collection Delessert)	Grey bark with red substance...	Quinquina de Jaen ou de Loxa, ligneux, rougeâtre. H.D., III., p. 114	Straight quills, grey-red bark, filo-like coat, rigid fibre.
21	5	C. cascarilla amarilla de Chito, Provincia de Jaen, Loxa (See **37).....	C. amarilla de Chito on the wood. The "amarilla" of M. Guibourt's "Petit Collection." H. D. III., 167	Cinchona pubescens, *β* purpurea (Weddell)	"Cusco"	Purpurea or ovata. H. D., III., 156...	Clearly identical with the samples of C. Purpurea in this collection.
22	22	C. cascarilla crespilla de Latuna de Loxa	White, corky, large quills. (Pereira.	Lucumæfolia, Weddell? the variety mentioned page 39 *Histoire*) ...	Would be called "crown"	... ...	Appears like a good bark.
23		C. quina parecida a la Quina amarilla de Mutis, descubierta por Tafalla en Chicoplaya en Peru.....	"Grosse ecorce désigné particulierement sous le nom de *Huanuco*." (Laubert).	Cinchona Micrantha (R. & P.) Cinchona micrantha *β* oblongifolia (Weddell)	Woody Huanuco bark	Quinquina de Lima gris, variété ligneuse. H.D., III., 111.	The original *Huanuco* bark.

No. Bark	No. Wood	Vernacular Name according to Pavon.	Description by other Writers.	Botanical Name and Specimens.	English Commerce.	Guibourt's Histoire des Drogues.	Remarks.
24	25	C. quina crespilla parecida á la buena de Loxa	Synonym "Quina carraquena" (Ruiz, according to Lindley, from MSS. of Ruiz)	"On ignore si c'est une espece ou une variété," Laubert & Tafalla...	Fibrous crown bark	Quinquina de Loxa jaune fibreux. H.D., III., 107	The cross cracks form rings with remarkably everted edges; but some of the quills are quite smooth and silvery.
25	27	C. quina con hojas un poco vellosas de los Anogues de Loxa	Fol. subvillosis, glandulosis. Floribus interne violaceis, Tafalla & Lambert (*c. con hojas poco velludas*)	C. Humboldtiana, Weddell. C. villosa. Three specimens *α C. villosa inedita* Pavon. β γ "C. sp. nova de Jaen de Loxa, son dos exemplares del numero 1er"	A peculiar Loxa like the Dumke Jaen	Q. de Loxa jaune fibreux. H.D., III., 107	Covered with lichens, giving it a leprous character.—Pereira.
26		C. cascarilla o quina de nagenal de Loxa	"Bark unknown to me."—Pereira	Cascarilla?	Unknown	... ...	Heavy bark, with coarse reddish fibre and epidermis like the oblongifolia.
27		C. cascarilla serrana de Huaranda Loxa (*Huaranda*, a mountain near Loxa. See Quinologia)	Follis obscure viridibus, floribus obscure rubicundis "*acanelada*," *i.e.* cinnamon-colour (Laubert & Tafalla)	C. rubicunda (Tafalla), variety of Cinc. ovata	Sold as a kind of Jaen bark	... ...	"Coarse, white-brown quills."—Pereira. With a mammelated coat.
28	28	C. con hojas de Lucuma. 2e especo	"White large quills" (Pereira) Follis sub-penduliformibus, capsulis sub-globosis. (Laubert & Tafalla)	Cinchona Condaminea, γ lucumæfolia, Weddell. Two specimens in the herbarium like the one given me by Dr. Weddell	Called "Crown bark"	... ...	Resembles entirely the bark described by me in the Pharmaceutical Journal.
29		C. cascarilla con hojas de Palton de Loxa	Follis lanceolatis, glandulosis, subtus luteo-virescentibus capsulis ovatis. (Laubert & Tafalla)	[The bark missing in the collection]	... ...	... ...	"*Palton*, pyri indicus genus."
30 (*29?)		C. cascarilla con hojas redondas de Quiebro de Loxa	Cinchona rotundifolia (Pavon, MSS. Lambert, *Ill.*, p. 5).	C. cordifolia & rotundifolia, Weddell. One specimen in the herbarium marked *Cinchona rotundifolia inedita* (*also*, two specimens of a round leaved variety of C. Condaminea	Ashy crown bark	Quinquina Loxa cendré (B.)	"A very distinct species."—Lambert.
31		C. ovata, o cascarilla bobapata de Gallareta del Peru	... ...	Cinchona ovata, Weddell	This particular sort does not come in commerce	... ...	A red substanced bark with white foliaceous epidermis.
32		C. globosa, uñas de Gato vel aculeata de Guayaquil	*Uñas de Gato* (cat's claws) "stipulis revolutis floribus capitatis, conglomeratis," (Laubert & Tafalla)	C. globifera, Pavon. Nauclea? Cinchonæ, De Cand.	Not common	... ...	Larger of No. *25 "resembles Howard's specimen" (Pereira)
33	31	C. quina colorada del Rey, de Loxa	*C. colorada*, fol. inequaliter ovatis, acuminatis, nervosis, glandulosis; floribus interne bicoloribus, capsulis virescentibus. (Laubert & Tafalla)	C. colorata, Pavon. Fol. ovatis utrinque acutis, floribus majoribus, Lambert. Two specimens in Lambert's collection, one with leaves resembling Condaminea *α* vera, the other more *ovate* leaves	Has probably ceased to come	... ...	Appears to be a variety of Condaminea.

No. Bark	No. Wood	Vernacular Name according to Pavon.	Description by other Writers.	Botanical Name and Specimens.	English Commerce.	Guibourt's Histoire des Drogues.	Remarks.
34		C. purpurea Fl. Per.	"Large quills, some pieces analogous to Cusparia bark on the outside. In general without cracks." (Pereira)	Cinchona pubescens, β Purpurea, Weddell. One specimen. *C. purpurea sp. nov. nihil. Flor. Peruv.* and another, Cinchona purpurea affinis sp. nov. inedita Fl. Peruv., which looks like the var. Pelleterana	"Cusco"	Gris pale ancien H.D., III., 122	Rough, coarse, rigid fibre, epidermis smooth, warty.
35	29	C. quina amarilla fina del Rey, de Loxa	*C. amarilla*. Fol. obovatis, acuminatis, floribus interne incarnatis (Laubert & Tafalla).	C. lutea Pavon., Fol. ovatis utrinque acutis, floribus majoribus.—(Lambert, p. 5.) One or more specimens in Lambert's collection similar to the *colorada*...	Very fine crown bark	Quinquina jaune de la Condamine	Ditto.
36	2	C. cascarilla chabarguera, de Loxa (See No. *32)	"C. species nova inedita vernacule *chabarguera*." C. *chabarguæa* nom indiem. Fol. glandulosis lanceolatis sub-repandis, capsulis ovalibus. (Laubert & Tafalla)	C. Condaminea, *a* vera. (One) specimen in Pavon's collection marked "Cinchona sp. nov. ined. Flor. Per. a Loxa.) Lambert has written in pencil. "Condamina." Also another marked "Cinchona sp. nov. inedita de Loxa, Quito, Peru."	"Rusty crown" bark (Husoles bark of the Germans), also "corky crown"	Quinquina Humanales ferugineux	A *smoother* Condamines bark than the Urituingas, the parallel cross cracks forming imperfect rings. This bark is said to have been the one which cured the Countess of Chinchon. (See Lindley, *Flor. Med.*, p. 413.)
37		Quina negra 1e esp. C. de Loxa (See No. *21)	Fol. floralibus ovatis; floribus interne purpureis	Cinchona Condaminea β Candolli	Ordinary Loxa, fine straight quills	Q. gris fin de Lima. H.D., III., 10	Some pieces, like dark Jaen bark, with black sooty patches, others like No. 4.
38		C. magnifolia Fl. Peruv. (vulgo *Flor. de Azahar*) (See No. 7)	"The outer surface of the derm is purple-brown, showing like roddish birch bark" (Pereira)	Cascarilla magnifolia, Weddell; three specimens in the herbarium	Imported to a loss in 1840-50	Quinquina nova ordinaire. H.D., III., 161	The bark varies much in colour. It is the *amarilla* of Ruiz, according to Humboldt, but De Candolle seems to doubt this appellation.
39		C. sp. nova de Jaen en Loxa, es buena corteza (*corteza* is thick bark)	Facies C. Condaminea, at diversissima (Lambert)	Cinchona Humboldtiana; arranged under this title are two specimens, marked "Cinchona species nova de Jaen de Loxa."	Comes probably as "crown"	... ...	Quilled transverse cracks, fibrous, moderately heavy, something like lancifolia.
40		C. sp. nov. parecida a la naranjada (naranjada) de Mutis, es del Peru	Compare Nos. 17, 23, *20, and *18	Cinchona micrantha.—Weddell	Huanuco bark, coarse pieces	... ...	True Huanuco bark.
41	36	C. nitida Fl. Peruv., es buena, del Peru	"La Peruviana" of Laubert. R. de Fe., II., 295	Cinchona nitida.—Wed. Two specimens in one sheet of the herbarium, one exactly that of Flor. Peruv., the other is C. Condaminea of Humboldt, and so marked by Lambert. Two on another sheet, one of *nitida*, one of Condaminea	Fine grey bark	Quinquina rouge de Lima. H.D. III., 120	The *Quinacaua legitima*, or true grey bark. Laubert. The substance cinnamon-colour, the derm purple marked resinous circle, coarse fibre.

No. Bark	No. Wood	Vernacular Name according to Pavon.	Description by other Writers.	Botanical Name and Specimens.	English Commerce.	Guibourt's Histoire des Drogues.	Remarks.
***				Cascarilla acutifolia, Weddell, one specimen in the museum marked *Cinchona acutifolia*	Not known	Quinquina a feuilles aigues de Ruiz. H.D, III. 105.	Grey bark, externally, with pink-red substance, internal surface chocolate.
45		C. acutifolia, Fl. Peruv.	(A) Collection Delessert.				
46		C. amarilla a Ynta sp. nova	Cascarilla amarilla de Hinta y de Chito (of Delessert's collection) C. amarilla del Juta (Laubert).....	Cinchona lutea, Pavon. Several specimens in the herbarium of Pavon (varieties of Condamines ε pitayensis?)	Comes from New Granada	... ...	A light-coloured Pitaya bark.
47 *21	4	C. negra de [Azogues de] Loxa. 2ª especie de Loxa. See No. 37	C. negra, 2di species, Fol. floralibus subcordatis, glandulosis, floribus purpureis. (Laubert à Tafalla.)	C. Condaminea β Candolli Cinchona heterophylla, Pavon MSS. "C. negra del pueblo de los azogues de Loxa" (Collection Delessert, P.)	Blackish inferior Loxa	Loxa inferieur, H.D., III., 103. "Cet ecorce est recue depuis plusieurs années dans le commerce, comme Q. de Loxa	Loxa bark, in twisted pieces, covered with crustaceous and other lithens.
48	11	C. quina con hojas de Zambo de Loxa	... ...	A variety of lucumæfolia in appearance	Would be called "crown bark"	Quina de Lima blanc. H. D., III., 111.	Fibrous as C. lancifolia; substance brown and harsh.
49	16	C. quina estoposa de Loxa	C. stupea, Pavon, MSS. (Lagasiljada of Laubert?)	C. Condaminea, var. One specimen marked "vulgo cascarilla estoposa," also "Cinch. stupea inedita	Comes with "ashy crown bark"	Quinquina de Loxa rouge fibreux du Roi d'Espagne. H.D., III., 105.	A lancifolia bark.
50	16	C. quina blanca pata de Gallinazo. 1ª especie	"Fol. lanceolatis, glandulosis, petiolo, nervoque centrali sanguineis," Laubert à Tafalla	Cinchona suberosa, Pavon MSS. Collection Delessert. (D.)	"Pale bark." Text in the Collection Delessert is *corky pale bark*	Quinquina blanc de Loxa	The bark resembles the *Provincialna*, or *Huanaco*, It has a greenish epiderm, and a *rusty* look.
		C. vulgo provinciana, sp. nova de Loxa	Agrees with Poeppig's specimens	Cinchona micrantha, Ruiz and Pavon. One specimen marked Cinchona micrantha, sp. nov. edita. Flor. Peruv. in Peru Andium nemoribus	"A similar specimen, recently sent from Peru under this name to Dr. Weddell	Q. gris de Lima, ou q.q. Huanuco (written in pencil by M. Guibourt)	Heavy bark, pieces ten inches long, with the coat of *Lima bark*; some wrinkled, some with cross cracks; no resinous circle, rusty looking, with greenish epiderm.
XXI		C colorada de Huaranda, sp. nov. inedita es hierra (Huaranda, a mountain of Loxa)	On the other side of the wrapper marked *Quina colorada del Rey, de Loxa*	Cinchona succirubra (Collection Delessert) from Pavon MSS.	Commercial red bark	Quinquina rouge non verrugueux. H.D., III., 121	Condsamines coat exfoliating, showing various crater-like depressions, quite the red bark of commerce.
*5	30	C. cascarilla colorada de los Azogues de Loxa	*C. colorada.* Foliis inequaliter ovatis, acuminatis, nervosis, glandulosis, floribus interne bicoloribus, capsulis virescentibus (Laubert à Tafalla?) this, or No. 33	C. Condaminea var.? [The bark] missing in the collection]	... ...	... ...	The bark on the wood is like the Q. colorada del Rey.
6 7	35	C. cascarilla colorada de Loxa	The wood bears this inscription, "C. colorada de Loxa, distinta especie."	[The bark missing in the collection]	... ...	... ...	The wood has a smooth bark, marbled with lichens, and detached with great facility.
*33 *18	18	C. casc. Provinciana de Jaen de Loxa	See No. 17	Cinchona micrantha. R. and P.	... ...	... ...	Greenish wrinkled Huanuco bark, cost easily exfoliates.
*19	37	Casc. amarilla de Loxa	... ...	[The bark is missing]	... ...	The bark on the wood resembles *Quinquina gris pale.*	
*26	21	C. cascarilla amarilla Urutusinga (Urituasinga, a mountain near Loxa)	Quina selectissima de Loja, C. urituasinga (Pavon)	C. condaminea, α vera, Weddell (*acaduaica* of Guibourt, as having been figured by La Condamine)	Old-fashioned Loxa, tied in bundles. The camutillo is wrinkled	Quinquina jaune du Roi d'Espagne. H. D., III., 129.	Bark on the wood very rugged, grater-like surface, colour quite black. The specimen of *that* in the Collection Delessert strongly resembles Calisaya in structure and in the coat.
*29		C. cascarilla amarilla del Rey, de Loxa	Follis lanceolatis glandulosis obscure virescentibus petiolo nervoque centrali sanguineis flore rubro. (R. de Ph., III., 294, Laubert à Tafalla)	[The bark is missing]			
*31	19	C. crespilla mala de macos (probably macacos, monkeys)	*C. crespilla mala (crispae*, frisée). Fol. ovato lanceolatis obscure virescentibus, capsulis ferrugineis. (Laubert à Tafalla)	[The bark missing in the collection]	... ...	... ...	Bark on the wood like No. 4.
*32		Quina chaharguera de Loxa (See No. 36)	The kind figured by Humboldt. See De C. Pr. IV., 332	Cinchona Condaminea, α vera. Weddell	"Rusty crown bark," "corky crown," and "silver crown bark"	Quinquina forrugineux. H.D., III., 147	Moderately small quills, transverse cracks, but not very numerous. Pereira.

No. Ex.	No. Wood	Vernacular Name according to Pavon.	Description by other Writers.	Botanical Name and Specimens.	English Commerce.	Guibourt's Histoire des Drogues.	Remarks.
**1		C. viridiflora, sp. nova del Peru, inedita	Marked *C. de flor verde* on the bark in *D. Dons's hand*	Cascarilla?	Unknown	... ...	The small quills resemble C. ovata, but are more brittle, rigid fibre like a cascarilla.
**2		Ditto	A second Specimen				
**3		C. purpurea Fl. Peruv.	See Nos. 19 and 34	... ...	"Cusco"	Gris pale ancien H.D. III., 152	Agrees with Weddell's specimens.
**4		C. ovata flor. Peruv.	(Similar to No. 31)	Cinchona ovata, Weddell. One specimen in the herbarium marked *α edita*. C. purpurea R. & P. *pubescens Vahl. β inedita. γ cordifolia, Mutis.* Secundum Mutisii iconem inedit., ni vehementer fallor. γ inedita.	Resembles in degree cordifolia	Llamada "provincia," H.D., III., 106............	No doubt the Cascarillo pallido of the Quinologia, the C. pallescens Ruiz. See De Cand. Prod. IV., 353.
**5		C. globosa, sp. nova ined. de Loxa	"Small fibrous." See No. 32	Cinchona globifera, Pavon. Nauclea? Cinchonæ, in De Cand. Prod. IV., 345............	Comes mixed with other barks	... ...	Extremely tough fibre, and peculiar microscopic structure.
**6		Quina blanca	"Short quills, whitish externally" (Pereira)	Cascarilla macrocarpa.—Weddell. Three specimens in the herbarium	Comes occasionally, but not in quills............	"Quinquina blanc de Mutis ecorce de son ovalifolia."—G. (Written in pencil)	Resembles C. purpurea, but more brittle—rigid fibre.
**7		C. amarilla de Chito sp. nov. inedita. See No. 21	The amarilla of Fortine's collection, Guibourt, III, 107)	Cinchona cordifolia, specimen β "*Cinchona sp. nova inedita de Loxa Quito Peru.*" C. pubescens, var. purpurea (Weddell) ...	Unknown	Quinquina Loxa cendre. H.D., III., 107............	White quills, with odd corky bumps, agrees with the specimens of C. pubescens.
**8		C. quina Azahar macho de Jaen Loxa	M. Guibourt considers it the *C. acutifolia* (No. 40)	Cascarilla Riveroana.—Weddell	Not known	... ...	Straight smooth quills, red colour.

(*To be continued*).

OBSERVATIONS ON THE LATE EARTHQUAKE IN THE WEST OF ENGLAND.

BY W. HAMILTON, M.D.

(*Extracted from private letters, but published by permission of the Author.*)

(*August 18th.*) ONE of those phenomena, which are of rare occurrence, at least within the limits of authentic history, in England, and of which I am not aware that any former instance has been recorded in Plymouth, was experienced here between the hours of seven and eight in the morning of the 12th instant, when an earthquake of some seconds' duration was felt in this town and neighbourhood; the direction of the motion appears to have been from S.E. to N.W., as it was felt at Callington about eight o'clock. The shock there appears to have been of considerable violence, as it greatly alarmed the inhabitants, and led them to apprehend that some magazine had exploded in their neighbourhood. At Beer, situated between this and Callington, on the Devon side of the Tamar, the shock threw down a farmer's milk-cans; it was also felt at Plymstock, about two miles on the other side of Catwater, at Prince Town on Dartmoor, and at Liskeard in the West. At what other places it was felt I have not been able to learn. I have given a brief account of what I have been able to collect in my letter to the Registrar-General, who will, I hope, obtain more detailed and authentic information through the Registrars of the district through which the convulsion was felt. The barometer, which has been low throughout the month, indicated a pressure of 29.57 inches at eight on the morning of the earthquake; at the same hour on the preceding day it was 29.08, and the following day 29.84. Thunder, storms took place on the nights of the 10th and 11th, and the atmosphere has been in a highly electrical state throughout the month. Plymouth and Devonport both stand on an argillaceous schist, and were on that account considered exempt from such visitations; but that prestige is now at an end; a similar prestige prevailed in Cumana prior to the great catastrophe of 1797, and singularly enough, from a similar cause, the peninsula of Araya being likewise seated on a schistose rock.

Humboldt remarks, at page 223 of the second volume of his *Personal Narrative*:—

"If in regions the most remote from each other, primitive, secondary, and volcanic rocks, share equally in the convulsive movements of the globe; we cannot but admire also that, in ground of little extent, certain classes of rocks oppose themselves to the propagation of the shocks. At Cumanà, for instance, before the great catastrophe of 1797, the earthquakes were felt only along the southern and calcareous coast of the Gulf of Cariaco, as far as the town of this name; while, in the peninsula of Araya, and at the village of Maniquarez, the ground did not partake of the same agitation. The inhabitants of this northern coast, which is composed of mica slate, built their huts on a motionless earth; a gulf of 3000 or 4000 toises in breadth separated them from a plain covered with ruins, and overturned by earthquakes. This security, founded on the experience of several ages, has vanished; and since the 14th of December, 1797, new communications appear to have been opened in the interior of the globe. At present the peninsula of Araya is not merely subject to the agitation of the soil of Cumanà, the promontory of mica slate has become, in its turn, a particular centre of the movements. The earth is sometimes strongly shaken at the village of Maniquarez; when, on the coast of Cumanà, the inhabitants enjoy the most perfect tranquillity. The Gulf of Cariaco is nevertheless only sixty or eighty fathoms deep."

The phenomena of earthquakes are involved in much obscurity, but there seems in many cases, as for instance in that of the 12th, some connexion between it and the electrical state of the atmosphere. Electricity is necessarily developed in great quantity during volcanic eruptions, from causes which are tolerably well understood at the present day, but why an electrical state of the atmosphere should accompany the convulsion of an earthquake in regions remote from an active volcano, is a problem yet requiring solution.

(*August* 31*st.*) The earthquake of the 12th inst. was felt more extensively than I was aware of at the time I had the pleasure of writing to you last, but as I cannot obtain any reliable statements of the time at which it was felt at the different places, I cannot trace with anything like certainty, the direction of the convulsion, but my impression is, that it was from east to west. Its severity appears to have been greatest down in Cornwall, since at Liskeard an old wall was thrown down by it, the bells of a house in Menbenniot were set ringing, and at Great Caradon and other mines, the workmen, imagining the roof of the mine was tumbling in, made a precipitate retreat to the upper world. Altogether, the shock appears to have been what Brother Jonathan would term pretty considerable.

Has this convulsion been connected with any volcanic or other disturbance in any other quarter of the globe? as, for example, with the eruption of Etna, which took place on the 20th, about eight days later; and to what source are we to ascribe its having been felt by the inhabitants of these towns, and as far east at least as Plymstock, where it was distinctly felt by my daughter, Mrs. Harrison, and others in the house of her father-in-law, for the first time within the records of authentic history. She describes it as a tremulous motion, accompanied by a low rumbling noise resembling that occasioned by the passage of a heavily-laden waggon. Are we to suppose it arose from some internal commotion of the globe, restricted to the portion immediately beneath our western peninsula? or can its effects be traced in any line connecting the West of England with Italy and Sicily.

With the internal condition of our globe we have no prospect of ever becoming more than hypothetically acquainted, but there are strong grounds for believing that at a depth of a few miles beneath the solid crust on which we are placed, there exists a mass of molten matter which contributes to maintain the heat of the surface. It has been ascertained by experiments made in our deepest mines, that the temperature increases as we recede from the surface, and that this temperature at the several depths is permanent throughout the year, and at all hours of the day and night, and is wholly independent of the presence or absence of the workmen, or the number of lights employed; and Mr. Hearder mentioned to me the name of a mine, which I now forget, in which at a considerable depth below the surface in the course of the working, several jets of boiling sea-water burst out, the water of which in its chemical composition corresponded exactly with that of the sea, which appears to have penetrated through some unknown crevice and reached the heated surface beneath, and in this state was forced upwards by the hydrostatic pressure from behind. Humboldt conceives the interior of the globe to be cavernous, but such an idea is opposed to all that we know of the density of the earth and the laws of gravitation. It would be worth while to investigate, as far as our means will allow, the nature of the interior of our globe, availing ourselves of the deepest mines which have been sunk, one of which in Cornwall somewhat exceeds a mile in depth.

If a society could be organized to collect information from persons connected with the deepest mines both in Great Britain and other parts of the world, it could not fail to add much to the existing stores of our knowledge. It is a remarkable fact, that most, if not all of the known volcanoes in the world partake of an intermittent character. That of Morne Agarou, in the Island of St. Vincent, appears to have a period of about ninety-four years; and its next state of Pyrexia may be looked for some time in the year 1906. The first eruption of which we have any authentic notice having occurred in 1718, and the second when I was at Nevis, on the 27th of April, commencing suddenly at noon, and not ending before the afternoon of the 1st of May. Dr. Anderson visited the crater on the 4th of March, 1784, after sixty-six years of repose, and found stronger symptoms of activity than were observed twenty-eight years later by a party who descended into the crater on the 26th of April, 1812, within twenty-four hours of its renewed activity. This eruption was the closing scene of a series of commotions which had kept the Azores, a large portion of North America and South America, in a state of agitation for nearly two years. The great earthquake which destroyed the city of Caracas preceded the eruption of Morne Agarou by only thirty-two days, and was clearly but a portion of one connected chain of phenomena. Whence arises this intermission, and this progressive march of agitation? Vesuvius re-awoke after a slumber of an unknown duration in the year 79—and Morne Pelee, in Martinique, like Vesuvius on the 5th of August, 1850—both bearing unmistakable traces of former activity at some period beyond the limits of human records. Multitudes of similar instances might be adduced, and the whole subject is one of deep mystery, and still deeper importance to our well being.

Plymouth.

ON THE ORIGIN OF MOUNTAINS AND VOLCANOES.

BY PAUL GORINI, OF LODI.

Professor Gorini, of Lodi, a distinguished natural philosopher, has been for some time engaged in certain experimental researches which tend to throw some light on the value of the various hypotheses hitherto suggested by geologists to explain the origin of mountains, volcanoes, earthquakes, and other phenomena of nature. He last year published the book, the title of which we have given below,* as a first volume of a work intended to explain and illustrate some new theories and principles which he has conceived, and which he contends are the only ones by which geology can henceforth make any progress in the discovery of truth in respect to the above-mentioned natural phenomena. The author goes further still; he introduces his principles into physiology, and claims to explain by them the more complicated phenomena and powers of life. He, however, reserves his further developments on this latter part to the next volumes, of which he promises the publication as soon as the several series of experiments he is now conducting shall have been completed. Our author appears to proceed on the very wise principle that in all scientific researches, experiments, whenever they are possible, ought to precede the assertion of principles and even of opinions; and he contends that *experimental* geology is not only possible but practicable; and indeed it is because he succeeded in establishing a theory of the formation of mountains and volcanoes on *experiment*, that he published a first volume more particularly devoted to this part, regardless of opinions graced by the greatest names in Europe. It would be difficult to convey, in our limited space, a complete idea of Prof. Gorini's system, but we can describe its principal feature in the following propositions:—

1. The original liquid, the external consolidation of which formed our globe, was a *plutonic*.

2. Plutonics are molecular unions of liquids with gases, a fundamental property of which is that in the act of solidifying a portion of the fluid matter is absorbed, and the other portion set free.

3. The first part of the terrestrial liquid that solidified, having formed an exterior shell or crust, the next stratum that began to solidify and set a portion of its gas free, found itself necessarily confined; the expansive force of the latter rent the crust in various parts and violently ejected portions of the liquid, which again solidifying on the spot formed prominences, through which other successive emissions of liquid were forced up by other solidifying internal portions of matter. At times these ejections were tumultuous and irregular, and at other times slow and regular, like mere infiltrations through the pores of the superincumbent consolidated matter, according to various modifying circumstances. It is thus that all mountains were formed.

4. The process of cooling and consolidation necessarily requires a great length of time, by reason of the great volume of the earth; and the now existing volcanoes are unfinished processes of the same nature. (To this latter subject the second volume will be more particularly devoted.)

5. Many substances exist in nature, with which artificial plutonics can be formed, and precisely the same effects permanently produced on a small scale, as nature has

* *Sull' Origine delle Montagne e dei Volcani, Studio Sperimentale di* Paolo Gorini. Lodi, 1851. (*On the Origin of Mountains and Volcanoes, Experimental Studies.*)

wrought in the formation of the terrestrial mountains, volcanoes, &c.; such effects are *necessary consequences* of the solidification of plutonics.

Such is the condensed expression of the views propounded by Prof. Gorini, amidst much other physical, chemical, and physiological matter, in an 8vo volume of 500 pages, written with elegance and clearness. This book, which exhibits an energetic mind struggling with bold conceptions in a vast field, made a sensation in all scientific circles in Italy; and as the author gave out that he had succeeded, by artificial plutonics, in repeating on the small scale the operations of nature, the "Society for the Encouragement of Sciences, Letters, and Arts," at Milan, appointed a commission of fifteen members from its own body to attend and witness some of Prof. Gorini's experiments, and to report* thereon to the society. This commission presented its report in May last, and the society ordered its publication. It is this detailed report, now before us in the shape of a pamphlet, that imparts a greater public interest to the subject. We regret that we can do no more, in the present notice, than give only the substance of the essential points of so elaborate and impartially written paper.

The commission begins by acknowledging the services previously rendered to science by Prof. Gorini, through his known admirable anatomical preparations, and other labours, and on the present occasion, the readiness with which he complied with their request, in conducting in their presence a series of experiments that lasted twenty-four days, and which afforded them an opportunity of examining and scrutinizing a number of facts which wonderfully illustrate the propounded theories. The commission profess entire ignorance of the materials used by Prof. Gorini (who has not yet published this information), but they state their conviction that one prominent among them must be sulphur, from the unerring manifestations of its characteristics. Proceeding to relate the facts that passed before them, the commissioners state that the operator takes some substances, which at the ordinary temperature are solid, subjects them together to heat in a large cast iron boiler, and after five to six hours, the mass is all fused and liquefied. By increase of temperature, namely, at 175° Cent., it becomes viscid and dense, presenting a phenomenon analogous to that of sulphur. The specific gravity was then ascertained to be 1.863. In this state, the mass is run off into other pans, where the temperature is reduced to 130° Cent., and then, having regained its fluidity, is transferred to a rectangular iron vessel, four-and-a-half feet long, three feet wide, and three inches deep. The mass, left there to itself, begins after some time to solidify at the surface, forming near the edges a needleform crystallization, with filaments and grouping around centres, as observable when water passes slowly into the state of ice. When a solid crust has been formed all over the surface, an eruption of liquid is seen here and there to break through the crust, and force its way to the surface, somewhat disorderly, and there it soon solidifies, forming in those spots irregular surfaces having various gibbosities. Sometimes one of these springs dries up soon, and another remains the channel of renewed eruptions, and sometimes, after the first are entirely dried, new eruptions force their way in other spots, and new prominences are formed. Meanwhile, internal commotion is going on, with noise and cracking, until all assumes an apparent quietness, and the surface again becomes all solid. Then another phasis appears, the liquid begins to filtrate from below through the crust, equally all over the surface, with a stupendous regularity and tranquillity; it expands a little and solidifies instantaneously, and is again covered with another emission of infiltrated liquid, which also soon solidifies, and this process of transudation goes on for some time. The first formed prominences are thus being continually increased in size by the matter accumulated on them, and this in so regular and imperceptible a manner, as to be scarcely seen by the naked eye. The surface of the liquid when just emitted is shining, and replete with innumerable small, almost microscopic bubbles of gas; as it dries, it becomes opaque. Sometimes the course of the regular slow transudation is interrupted by some fresh violent commotion, accompanied by irregular eruptions, and these alternations cease when the entire mass has solidified and cooled, which, for a quantity of material of about 150lb. English weight, takes place in about eleven to twelve hours. The prominences finally formed on the surface present varied

* *Rapporto della Commissione incaricata di assistere agli esperimenti del Professor Paolo Gorini.* Milano, 1852. (*Report of the Commission appointed to attend the Experiments of Professor P. Gorini.* Milan, 1852.)

figures and heights, quite analogous to the accidents found in the natural mountains. When the dried mass is broken up, it is found to be formed of two parts easily distinguishable; the inferior has a dark, earthy colour, and is compact; the superior part is yellowish, more soft and porous; but the commotions which the mass has undergone have detached some isolated portions of the one part, and intermixed them with the other. The texture is to some extent crystalline, needleform and fibrous, recalling the crystallization of sulphur. The total volume has increased from that of the liquid state.

In some experiments intended to illustrate the principle of earthquakes (in which a slight variation in the compound is made by Prof. Gorini), the following results were observed by the commissioners, besides all the phenomena already described. When the first solidification of the surface had taken place, the operator stuck in the crust some small iron rods, having little bells suspended to them. After a short time the commotions of the substratum began to appear with progressing intensity, internal bursts were heard, parts of the crust oscillated or heaved up, and some of the bells rang; at times the violence was such that some bells were flung out of the vessel, as well as portions of the liquid itself; cracks and lacerations in the crust were frequent; and in the interval of some hours as many as twelve of these complex manifestations of internal agitation were counted. The consolidated and cooled mass being broken up, it exhibited several concentric strata, disposed almost in cylindrical surfaces, having the horizontal axis in the middle of the vessel; the larger is the vessel in which the operation has been performed, the smaller is the curvature.

The experiments were repeated with various modifications of circumstances, which produced modifications of details, illustrative of what Prof. Gorini calls *plutonic* and *plutonico-aquatire* substances.

And while the commissioners abstain altogether from pronouncing an opinion on the theories put forth by Prof. Gorini, which they say it belongs to time and to the philosophers of Europe to sanction, they cannot refrain from highly appreciating his labours and experiments, as tending very greatly to assist science in lifting the veil which still covers the great laboratory of nature.

The same experiments have been since performed in the halls of the Scientific Society at Milan, before all the members, and with unvaried success.

In concluding this notice, we feel bound to state, that the reason for which Prof. Gorini has not yet published his processes is, as he himself says, that he finds in nature a great number of substances that form plutonic liquids, and he wishes to continue his experiments, until he can determine the simplest and best matters for the purpose, and to approach, as far as possible, what he conceives to have been the true and original agents used by nature. Meanwhile he expects to have completed his physiological researches, and then he will lay everything before the public, trusting, he says, that posterity will give him credit for a share in labours which point to the right direction in the discovery of truth.

(We have considered the subject-matter of the present notice to be of sufficient interest to the readers of this Journal to justify us in going to somewhat greater length than we should otherwise have done.) M. H. P.

COSCINIUM FENESTRATUM. (*False Columba-root.*)

Nat. Ord. *Menispermaceæ.—Dioecia Hexandria.*

BY SIR W. J. HOOKER, D.C.L., F.R.S., AND L.S.

Gen. Char. COSCINIUM, *Colebr.* (char. reform.) *Flores* dioici. MASC. *Sepala* 9-12, circa receptaculum cylindraceum ternatim imbricata, subæqualia, vel 3-6 *ext.* interdum paulo minora, omnia ovata, valde carnosa, extus tomentoso-pilosa, *int.* membranaceo-petaloidea. *Petala* nulla. *Stamina* 6, biserialia; *filamenta* carnosa, 3 demum rotato-expansa. *Petala* nulla. *Stamina* 6, biserialia; *filamenta* carnosa, 3 *ext.* libera apice reflexa, 3 *int.* in summo receptaculi imo coalita, erecta; *antheræ* seriei *ext.* 1-lobæ, introrsæ, *int.* 2-lobæ, lobis sejunctis utrinque lateralibus, omnibus ovatis apice filamenti semi-immersis, 2-loculatis, 2-valvatis, valvis in septo rimas verticali hiantibus. FEM. *Stamina* sterilia 6, hypogyna. *Ovaria* 3, valde sericea. *Styles* tenuis. *Stigma* recurvum. *Drupæ* 3, vel abortu pauciores, globosæ, carnosæ, tomentosæ, monopyrenæ. *Nux* ossea, crassa, ovata, dorso convexior, sutura

peripherica vix conspicue 2-valvaris, ventre condylo* interno magno globoso foraminibus 2 prope hilum perforato instructa, 1-locularis. *Semen* loculo conforme, meniscoideo-globosum, facie interna valde cavum. *Integumentum* tenue, membranaceum, reticulatum, in plicis albuminis insinuatum. *Embryo* fere rectus, paulo curvatus, inversus, intra *albumen* amplum carnosum quasi bilaminarem inclusus; lamina externa simplici tenuissima, interna valde crassa et in lamellas plurimas seu lobos transversos convoluto-plicatos profundissime ruminata, superficie hinc bullata; cotyledonibus tenuissime foliaceis oblongis profunde sinuato-laciniatis lateraliter divaricatis et in loculis sejunctis intra laminas utrinque positis, *radicula* supera brevi terete ad hilum spectante multo longioribus.—Frutices *scandentes, insulæ* Indiæ Orientalis *indigenæ*; folia *longe petiolata, peltata vel palmata, 5-7-nervia, crasso-coriacea, supra glabra, subtus tomentosa*; racemus *& supra-axillaris, petiolo brevior*; flores *minuti, sessiles, in capitulis pedunculatis omnino cano-tomentosis, dense aggregatis. Miers.*

Coscinium *fenestratum.*

Coscinium fenestratum. *Colebr. in Linn. Trans.* v. xiii. p. 65. *Walp. Repert. Bot.* v. i., p. 95.

Pereiria Medica. *Lindl. Fl. Med.* p. 370.

Menispermum fenestratum. *Gært. Fruct.* v. i. p. 219, t. 46. *De Cand. Prodr.* v. i. p. 451. *Roxb. Fl. Ind.* v. iii. p. 809.

Cissampelos convolvulacea, *α* et *β*. *Moon's Cat.* p. 70.

Wennevelle, or *Wennewele-gette*, of the Cinghalese.

We have received seeds of this plant at the Royal Gardens of Kew, which are recently sown, from our valued friend Mr. Thwaites, of the Botanic Garden in Ceylon. These seeds were accompanied by a coloured drawing of the plant, which enables us to give the representation of a plant of some interest in the Materia Medica,—the same kind of interest, I mean, as is felt in the detection of the adulteration of tea, coffee, tobacco, &c.; for there has been of late a very extensive importation of what we here term *false Calumba-root*,† instead of the true Calumba-root, *Jatcorrhiza palmata*, Miers (*Flora of the Niger Expedition*), Cocculus palmatus, *De Cand.* (and of *Bot. Mag.*, Tab. 2970, 2971). Daniel Hanbury, Esq., of Plough-court, London, in a recent volume of the Pharmaceutical Journal‡, gave a history of this fraud on the public; and immediately opened a correspondence with Mr. Thwaites on the subject of the plant in question. The *Coscinium* was scarcely known to botanists but by the brief description of the curious seed (curious as to internal structure, published by Gærtner, l. c.), and the still imperfect description of the plant by Mr. Colebrooke in the *Linnæan Transactions*, and Dr. Roxburgh in his *Flora Indica*, from specimens and information communicated to those Indian botanists from Ceylon by General Macdowall. A notion had prevailed, derived from the name of the Calumba or Columbo plant or root, that it was derived from Columbo in Ceylon, and a native of that island. At length, as shown in the *Bot. Mag.*, Tab. 2970, 2971, it was ascertained that the true plant was a native of Mozambique, where it is known by the name of *Kalush*, or *Kalumba*. General Macdowall then sent our present plant to his scientific correspondents in order to ascertain whether this, much celebrated in the Cinghalese Pharmacopœia, was not the *true* Calumba-root, and for that purpose consigned a pretty large bit of the *root*, sawed from the centre of a knot, to Dr. Roxburgh, that he might make experiments with it. Dr. Roxburgh, in a note, *Fl. Indica*, vol. iii., p. 811, at once sets the question at rest: "This is certainly not the *Calumba-root* of our Materia Medica." Nevertheless there have been large importations and ready purchasers§ for the Ceylon drug into England, the real properties or virtues of which (belonging though the plants do, to the same Natural Family) are, to say the least, very problematical.

* The *condyle* is an extension of the placenta, sometimes internal, but mostly an external feature, offering an excellent and constant generic character of some importance in this family.—*Miers.*—To Mr. Miers we are indebted for the above amended generic character of *Coscinium*, which he has prepared, with a complete analysis of figures, for his Memoir on the *Menispermaceæ*, and where the specific characters of three additional species will be given.

† In the *Flora Indica* it is implied that the roots (not the stem) are employed, as is the case with the true *Calumba-root*.

‡ Vol. x., p. 321. January, 1851. *On an article imported as* Calumba Wood, *supposed to be the produce of a* Menispermum.

§ [*Note by Mr. Hanbury.*]—This is incorrect. The Calumba Wood, I believe, proved unsaleable.—D. H.

It now only remains for us to give Mr. Thwaites's remarks and descriptions in his own words:

"This species is very abundant near the sea-coast in Ceylon, and occurs also in the Central Province. The specimens from which the accompanying figure was taken, were procured about twelve miles from Kandy. The Cinghalese value this plant very highly, using a decoction of the knotty parts of the stems (not the roots) as a tonic and anthelmintic. The wood yields an inferior yellow dye." *Thw.*

Some further remarks on the uses of this plant are given by Mr. Thwaites in a letter (dated Peradenia, August 14, 1851) to Mr. Hanbury, in reply to some queries of that gentleman. "The *Menispermum fenestratum*, Roxb., is taken here I am told by an intelligent native, *mixed with other things*, in a great many complaints, and applied externally in some cases, such as for weak eyes, &c. The mode of preparing it, is to chop up the wood at the knots of the stem very small, and to boil it (with other things, which was particularly impressed upon me) in seven measures of water, until they are evaporated down to one measure. It seems to be one of the numerous universal medicines employed here in any and every complaint. It is quite impossible to get at any definite information from the natives as to what particular complaints certain plants are useful in. The priests, who are the doctors, appear to me to mystify the poor people by directing them to take certain leaves and roots which it often gives them no little trouble to find; and I think that the mind being employed in the matter, as well as the bodily exercise the patient often takes to procure the valued remedies, and a certain mixture of faith, have more to do with the cure than the drugs, some of which are evidently perfectly valueless except to feed cattle."

COSCINIUM FENESTRATUM, Colebr.

1. Portion of a branch with male heads. 2. Male flower. 3. Female flower. 4. Fruits.

Descr.—*Trunk* and large *branches* scandent, stout, thick, ligneous, and knotty. The *wood* of a deep, lively yellow colour, and of a pleasant bitter taste. *Leaves* alternate, petioled, cordate, entire, five or seven-nerved, smooth and shining above, very hoary underneath, sometimes acuminate, sometimes obtuse; from three to nine inches long, and from two to six inches broad; in young plants frequently peltate. *Petioles* shorter than the leaves, round, downy. *Umbellets* or *heads* of flowers axillary, several from the same bud, on thick round downy *peduncles* of about an inch in length. *Flowers* numerous, subsessile, villous, of a brownish green. *Sepals* brown, villous; the three interior larger, pale within, and reflexed. Male. *Heads* of flowers smaller than in the female plant. *Stamens* six; the three inner cohering nearly to their summits; the three exterior nearly free, somewhat recurved. Fem. *Sterile filaments* strap-shaped, hairy. *Styles* much reflexed, becoming dark brown. *Drupes* nearly round, villous, of the size of a large filbert. As the fruit advances in size, the very short pedicel of the original flower lengthens into a pretty long, stout, cylindric, villous *pedicel*, ending in a round-headed receptacle, on which the one to three drupes are situated, surrounded by the permanent calyx.—*Thw.—Curtis's Botanical Magazine*, July, 1852.

[Since the above was in type, we have been informed that eighty bales of the wood of *Coscinium fenestratum*, catalogued as "*Colombo Root*," were offered for sale in the city within the last few weeks.—*Ed. of the Pharm. Journ.*]

ON THE OCCURRENCE OF BERBERINE IN THE COLUMBA WOOD OF CEYLON, THE MENISPERMUM [COSCINIUM] FENESTRATUM OF BOTANISTS.

BY JAMES D. PERRINS, ESQ.

The following investigation was made in the chemical laboratory of St. Bartholomew's Hospital, under the immediate supervision of Dr. John Stenhouse. Dr. Stenhouse having had for some time past a quantity of wood of the *Menispermum fenestratum* in his possession, suggested to me this investigation. I am anxious, therefore, to acknowledge my obligation to him, not only for the material, but also for several valuable suggestions in the course of the inquiry.

Hitherto the chief source of the alkaloid berberine has been the root of the barbery, *Berberis vulgaris*. Bödeker, however, about four years ago, ascertained its existence in the columba root of pharmacy, the *Cocculus palmatus*, where it occurs in small quantity associated with columbine. The following remark is made in the *Chemical Gazette* for 1849, vol. vii., p. 150:—"The occurrence of berberine in *Berberis* and *Cocculus* is remarkable in a physiological point of view. Bartling places both of these families, the Menispermeæ and Berberideæ, in the class of the Cocculineæ, which is in accordance with the fact of both containing the same principle." As berberine has now also been found in another of the Menispermeæ, the accuracy of Bartling's view seems to be greatly confirmed.

The following was the process adopted for the extraction of berberine from the *Menispermum fenestratum*. A quantity of the wood, which had a bright yellow colour resembling that of quercitron, was rasped, and then treated with successive portions of boiling water till it had become nearly tasteless. The aqueous decoction acquired a deep yellow colour and an intensely bitter taste. It was next evaporated carefully to the consistence of an extract, then introduced into a flask and boiled with ten or twelve times its bulk of rectified spirit of wine, filtered while hot, and the residue boiled with a further quantity of spirits, which dissolved the berberine, and also a quantity of resinous matter by which it was accompanied. The alcoholic solution was then introduced into a retort, and the spirit carefully distilled off, until the residue on agitation appeared to have nearly the consistence of oil of vitriol. It was then set aside in an open vessel, and in the course of twenty-four hours the liquid became filled with a mass of impure crystals.

After draining off the mother-liquor, these crystals were washed with a small quantity of cold spirit, redissolved in boiling alcohol, and set aside to crystallize. Their complete purification was attempted by repeated crystallizations. It was found, however, that a small quantity of resinous matter adhered obstinately to the crystals, causing them to remain of a brownish-yellow colour. This brownish tint

was ultimately entirely removed by solution in spirit of wine and digestion with a little purified animal charcoal, the pure berberine crystallizing from the solution in beautiful bright yellow needles. The crystals were found to contain nitrogen, and their behaviour with various reagents corresponded exactly with those of berberine.

As these crystals were very soluble in boiling water, a quantity of them was dissolved in that menstruum; and on the addition of the requisite amount of hydrochloric acid, a crystalline precipitate was immediately obtained in the form of long, slender, golden-coloured needles, of a fine silky lustre.

This salt was dried in a water-bath at 212° Fah., and subjected to analysis with the following results:—

6.25 grs., ignited with chromate of lead, gave 14.398 grs. of carbonic acid and 3.2 grs. of water.

The nitrogen was determined by Wills's method. 8.18 grs. of salt gave 4.94 grs. of the double chloride of platinum and ammonium.

The chlorine was determined as chloride of silver. 3.59 grs. gave 13.5 grs. of chloride of silver.

Hydrochlorate of Berberine.

	Calculated numbers.		Found numbers.
42 equivs. Carbon	3150 ...	62.75 ...	62.79
20 equivs. Hydrogen	250 ...	4.98 ...	5.67
1 equiv. Nitrogen.....	177 ...	3.53 ...	3.78
1 equiv. Chlorine	442 ...	8.85 ...	9.02
10 equivs. Oxygen	1000 ...	19.90	
	5019	100.00	

These results correspond pretty closely with the formula of hydrochlorate of berberine, which, when dried at 212° Fah., contains one equiv. of water, and is consequently $C_{42}H_{18}NO_8$, HCl+HO.

The hydrogen in this determination is considerably too high, which, however, is easily accounted for, as the hydrochlorate of berberine, after being dried in the water-bath, is eminently hygroscopic, and consequently absorbs moisture rapidly while being mixed with the chromate of lead. This observation has already been made by Fleitmann, who, while analysing this salt, obtained an equally great excess of hydrogen.

A quantity of the double platinum salt was also prepared by mixing a solution of the hydrochlorate of berberine with one of chloride of platinum. The compound obtained corresponded precisely in its appearance and properties with the salt prepared in the same way by Fleitmann.

2.80 grs. of salt gave 0.49 gr. of platinum=17.5 per cent., the calculated quantity being 17.55 per cent.

A small quantity of the acid chromate of berberine was also prepared by adding a solution of bichromate of potash to one of hydrochlorate of berberine. The salt which precipitated likewise perfectly agreed in its properties with the acid chromate examined by Fleitmann.

The results of these analyses and reactions leave no doubt as to the identity of the alkaloid, and also serve to corroborate the correctness of Fleitmann's formula for berberine, which I briefly subjoin:—

Berberine crystallized at the ordinary temperature ... $C_{42}H_{18}NO_8+12HO$.
Berberine dried at 212° Fah. ..... $C_{42}H_{18}NO_8+2HO$.
The hydrochlorate dried at 212° Fah..... $C_{42}H_{18}NO_8+HCl+HO$.
Double chloride of berberine and platinum..... $C_{42}H_{18}NO_8+HCl+PtCl_2$.

The *Menispermum fenestratum* is, according to Ainslie, a large tree, which is very common in Ceylon, and an infusion of which has long been employed by the Cinghalese as a valuable tonic bitter.

Gray, in his *Supplement* to the Pharmacopœia, informs us that this tree is known to the Cinghalese by the names of Woniwol and Bangwellzetta.

Berberine may easily be obtained in very considerable quantity from columba wood, the whole of which it pervades, and of which it is the colouring principle; and if, as I suspect, the resinous matter accompanying it consists chiefly of altered berberine, improved methods of extraction, such for instance as the employment of

a vacuum pan apparatus, would in all probability still further augment the amount of product.

I am informed that berberine is employed as a remedial agent on the continent, but its scarcity seems hitherto to have prevented its introduction into the medical practice of this country. As a good source for it has now been pointed out, it may be expected that berberine will take its place with the other alkaloids in our materia medica. To prevent misconception from the similarity of names, it may perhaps be well to remark, that berberine and bebeerine are very different substances,—the latter being the active principle of the bark of the bebeeree tree of Guaiana, and as yet has not been obtained in a crystalline form.—*Philosophical Mag.*, August.

St. Bartholomew's Hospital, July 20, 1852.

ON THE CONSTITUENTS OF THE HERB OF GALIUM VERUM AND GALIUM APARINE.

BY ROBERT SCHWARTZ.

In continuing his examination of the plants belonging to the family Rubiaceæ, the author selected as representatives of the sub-division Stellatæ, the two above-mentioned plants. He discovered in them several substances by which other plants of this family are characterized, and also a peculiar acid, which, by its composition, is allied to the series of tannic acids already discovered in this family. The method by which he proceeded, was the same as has been followed in his former experiments.

The decoctions of the herb were first precipitated by means of a solution of sugar of lead, and the greenish-yellow precipitate thus obtained contained a large proportion of citric acid, a small quantity of tannic acid, and inorganic acids combined with oxide of lead. The subsequent precipitate produced with the basic acetate of lead, evinced, by its lively chrome-yellow colour, a larger proportion of tannic acid. If the decanted liquor be precipitated by ammonia, a whitish mass falls down, which, besides a large quantity of basic acetate of lead, contains *rubichloric acid*, described some time ago by Rochleder and by the author.

The question was now to obtain the tannic acid as a pure compound with lead, as there were no means of producing other combinations from which the composition of the acid could be determined. Moreover, the incapability of the pure acids to crystallize, the difficulty of freeing them from water, and the facility with which they are oxidized, rendered these lead compounds compared with the analyses of the hydrates, alone available for obtaining a formula.

The composition appears to be $C_{14} H_8 O_{10} + HO$, which formula is calculated from the analyses of the lead compounds, which have been obtained from galium gathered at different times.

Galitannic Acid.—If the chrome-yellow, well exhausted, air-dried precipitate, thrown down by basic acetate of lead in the decoction of the herb (after the precipitate produced by sugar of lead has been removed) be decomposed under strong spirit of wine by sulphuretted hydrogen, the excess of sulphuretted hydrogen, as well as any portion of citric acid separated from the liquid by complete precipitation with sugar of lead, and the tannic acid combined with oxide of lead by the addition of acetate of lead, a beautifully yellow substance is obtained, which, being decomposed by sulphuretted hydrogen, yields the pure acid, the watery solution of which possesses a bitterish astringent taste, assumes with chloride of iron a green colour, and with alkalies and ammonia, in consequence of the speedy oxidation, a brownish colour.

Neutral acetate of lead affects it but slightly, basic acetate of lead precipitates it completely of a yellow colour. Acetate of copper produces a dirty brown precipitate, which is, however, not suited for analysis. Its relation to the other metallic salts is the same as that of the other tannic acids, with which it shares almost all other properties. When heated, it is rapidly decomposed, and burns with an empyreumatic, somewhat saccharine smell. It is composed of $C_{14} H_8 O_{10} + HO$, as deduced from the analyses of the various combinations of lead, which, prepared at different times, have always been constant. These compounds of lead, must, however, be dried in a vacuum, because they assume at 100° a green colour, and attain a higher degree of oxidization. The lead compound contains in 100 parts :—

			Calculated.	Found.	
70 equiv.	Carbon	420	17.84	17.77	17.53
45 "	Hydrogen	45	1.91	1.97	2.06
55 "	Oxygen	440	18.69	18.53	18.31
13 "	Oxide lead	1450.28	61.56	61.73	62.10
		2355.28	100.00	100.00	100.00

The formula corresponds to 3 ($C_{14} H_7 O_{12}$, 3 Pb O) + 2 ($C_{14} H_8 O_{10}$, 2 Pb O). Subtracting the oxide of lead, the formula for the acid is $C_{14} H_8 O_{10}$.

It cannot be denied that the mere composition of the lead compound is not a sufficient proof of the actual formula of the pure tannic acid. It is necessary to obtain the acid in an isolated state, and to become more acquainted with its products of decomposition.

Citric Acid.—During the preparation of the tannic compounds, various reactions indicated the presence of citric acid; and, by the following process, a sufficient quantity was detected to substantiate this fact. A concentrated decoction of the herb was completely precipitated by basic acetate of lead; after this impure salt of lead had been decomposed with sulphuretted hydrogen, the obtained liquid was mixed with diluted milk of lime, by which the tannic acid, phosphoric acid, sulphuric acid, &c., formed insoluble compounds, and the slightly coloured solution of citrate of lime was decomposed by very diluted sulphuric acid. After filtering off the gypsum, the excess of sulphuric acid was removed by carbonate of lead, and the traces of lead by sulphuretted hydrogen; by this process, an acid liquid remains, which, evaporated in the water-bath to the consistency of a syrup, forms, after a few days, small, hard granular crystals, which, under the microscope, completely resembled those of citric acid, and produced the same reactions when dissolved.

An additional proof of the identity of these crystals with citric acid was finally afforded by the analysis of a compound of lead formed with them.

Rubichloric Acid.—If the decoction of the herb of Galium be completely precipitated by the basic acetate of lead, a small quantity of ammonia applied to the removed liquid, and the now produced whitish, mucilaginous precipitate collected on a filter, decomposed, like the former, with sulphuretted hydrogen, and heat applied to the liquid filtered from the sulphuret of lead after expelling the sulphuretted hydrogen by a small quantity of diluted muriatic or sulphuric acid, a finely divided green precipitate is produced in the liquid, which subsides very slowly. It is easily recognized as that peculiar product of decomposition of that acid, which Rochleder and after Willigk has discovered in the Rubia (herb and root), and which also the author has detected in the herb of Asperula adorata.

Rochleder denominated it *rubichloric* acid, and the green substance itself *chlorrubin*.

The proportion of this acid to that of chlorrubin $C_{14} H_4 O_8$, is by no means inconsiderable.

The substances described above, together with chlorophylle, starch, and those substances common to all plants, form the principal components of the two species of Galium. The proportions, however, were not the same in both; Galium verum contained a considerably larger proportion of tannic acid than Galium Aparine; whilst citric acid was preponderating in the latter. The proportion of rubichloric acid is perhaps the same in both.—*Annalen d. Chem. u. Pharm.*, Bd. lxxxiii., Hft. 1, p. 57.

[In the *London Medical Gazette* for October 4, 1851, Dr. Winn drew the attention of the public to the efficacy of Galium Aparine in lepra. At that time he administered the remedy in the form of a strong decoction, made by boiling a large handful of the recent plant in a quart of water for about twenty minutes. Of this decoction he gave a large tumblerful three times daily; finding, however, that this was a very inconvenient mode of giving the medicine, he requested Mr. Hooper to prepare an inspissated juice, or concentrated fluid extract, which, Dr. Winn finds, acts much more rapidly and effectually than the decoction. A teaspoonful of this extract is quite equal to half-a-pint of the decoction: that is, judging from the effects produced

by it. Dr. Winn finds a drachm, taken three times a day, quite sufficient for ordinary cases. He has lately tried the remedy with success in a variety of cutaneous diseases. A case of lichen circumscriptus, which had resisted other remedies, gave way speedily to the influence of galium. In another case of syphilitic lichen the rash was fading rapidly when the patient was last seen. We understand that Dr. Bence Jones has found it of service in a case of lepra, now under his care, at St. George's. Some account of recent observations on the effects of Galium will be found in Dierbach's *Neuesten Entdeckungen in der Materia Medica*, vol. iii., 1847.—Ed. Phar. Journ.]

AMOMUM GRANUM PARADISI.

GRAINS OF PARADISE AMOMUM; OR MELLEGETTA PEPPER.

Nat. Ord. *Zingiberaceæ.—Monandria Monogynia.*

BY SIR W. J. HOOKER, D.C.L., F.R.S, AND L.S.

Gen. Char. Calyx tubulosus, spice trifidus. *Corollæ tubus* brevis, limbi lacinia exteriores laterales postica angustiores; interiores laterales nullæ; *labellum* maximum, explanatum. *Filamentum* complanatum, lateribus apiceque ultra antheram muticam productum, lobulis duobus auctum, lobo terminali bifido. *Ovarium* inferum, triloculare. *Ovula* in loculorum angulo centrali plurima, horizontalia, anatropa. *Stylus* filiformis, inter antheræ loculos receptus; stigma infundibuliforme. *Capsula* sæpius baccata, trilocularis, loculicido-trivalvis. *Semina* plurima, arillata.—*Herbæ inter tropicos veteris orbis indigenæ, species Americanæ dubiæ*; radicibus *articulatis, repentibus*, foliis *bifariis membranaceis vaginis fissis*, inflorescentia *radicali, spicata*, bracteis *imbricatis*. *Endl.*

Amomum *Granum Paradisi*; caulibus elongatis, foliis elliptico-lanceolatis tenuiter acuminatis rubro-marginatis, scapis brevissimis radicalibus bracteatis subtrifloris, corollæ labello amplo rotundato plicato-undulato.

Amomum Grana Paradisi. Linn. *Sp. Pl.* vol. i., p. 2? Pereira, *Elem. of Mat. Med.*, vol. ii., p. 1130, *fig.* 234 (*capsules*).

Amomum grandiflorum. Sm. *Exot. Flora*, vol. i., t. 111.

Amomum exscapum. Sims, *in Ann. of Bot.*, vol. i., p. 248, t. 13.

Amomum Afzelii. Roscoe, *in* Linn *Trans.*, vol. viii., p. 354.

Whether or not this be what is intended as the *Amomum Grana Paradisi* of Linnæus ("scapo brevissimo ramoso") will perhaps for ever be a doubtful question. But of this we are certain, that our plants in the Royal Gardens, here figured, were raised from seeds of capsules sent to us as Malagetta pepper or grains of Paradise, from Sierra Leone, by Mr. Young; and that these capsules correspond exactly with those figured in Dr. Pereira's admirable *Elements of Materia Medica and Therapeutics*, vol. ii., p. 1130, f. 234, as "*Amomum Granum Paradisi* of Afzelius' Remed. Guineense, vol. x., n. 1," and as *A. Grana-Paradisi*, Smith, in Rees. *Cycl.*, vol. xxviii., as *Malegetta*, as an inhabitant of the Guinea coast about Sierra Leone, we have not the smallest doubt. Equally certain it is, so far as can be judged from figures, that it is the *A. grandiflorum* of Smith in *Exotic Botany*, tab. 111, "raised from seeds gathered by Afzelius at Sierra Leone:" nor do we hesitate to pronounce, notwithstanding some trifling discrepancies, that it is also the *A exscapum* of Dr. Sims, figured and described in the first volume of *Annals of Botany*, p. 548, t. 13, from specimens raised by Mr. Loddiges, of Hackney, the seeds of which were sent by Professor Afzelius from Sierra Leone. *A. Afzelii*, Roscoe, is acknowledged to be identical with the *A. exscapum*, Sims. Beyond the above synonyms we dare not go. Linnæus we quote with doubt; for that author refers to Rheede's figure in the *Hortus Malabaricus*, and gives Madagascar, as well as Guinea, for the native country of the species; to which Willdenow adds Ceylon.

The term *Melegueta* or *Mellegetta pepper*, has been applied to several Zingiberaceous plants, and to this among them. "It is usually," Dr. Pereira observes, "considered to be synonymous with the terms *Grains of Paradise* and *Guinea grains*.

Melegueta pepper is said to have been known in Italy before the discovery of the Guinea coast by the Portuguese in the fifteenth century. It was brought by the Moors, who used to cross the region of Mandingha and the deserts of Libya, and carry it to Mundi Barca (or Monte de Barca), a port in the Mediterranean. The Italians, not knowing the place of its origin, as it is so precious a spice, called it '*Grana Paradisi*.'" Another kind of *Amomum Melegueta pepper*, is the *A. Melegueta*, Roscoe, figured in that author's work on Scitamineous Plants. The flowers are small, the leaves long and narrow, and the fruits very large and pear-shaped. The fruits of both kinds seem to be indifferently employed in lieu of pepper in Western Africa, and are esteemed the most wholesome of spices, and generally used by the natives to season their food. The principal consumption of grains of Paradise in Europe is in veterinary medicine, and to give an artificial strength to spirits, wine, beer, and vinegar. Although the seeds are by no means injurious, an Act was passed in 56 Geo. III., c. 58, that no brewer or dealer in beer shall have in his possession or use grains of Paradise, under a penalty of £200 for each offence; and no Druggist shall sell it to a brewer, under a penalty of £500 for each offence."—*See* Pereira. Our plants flower in the stove in May, and make a handsome appearance.

Fig. 1.

Amomum Granum Paradisi.

Fig. 1. *Flower from which the segments of the perianth are removed.*

DESCR.—*Roots* creeping, or rather they increase by aggregation of the tuberous knobs of a red colour, from which the stems arise. *Stems* sterile, two to three feet high, very red at the base, and dull purplish-red above from the long sheathing petioles of the foliage. *Leaves* sparse, small, and remote below, more approximate above, yet distant, spreading obliquely, not horizontally, elliptical lanceolate, with a very narrow long, almost setiform acumen, obliquely penninerved, full green above, paler beneath, the margin red. *Petiole* auricled at the top. *Scape* reduced, very short, clothed with lax erect scales, red below and short, much elongated, striated, and membranaceous, and reddish-yellow above; these embrace the flowers, and persist with the fruit. *Calyx* (Endl.) or *exterior perianth* forming a long tube below, cut into three oblong, erect, membranaceous segments, white, tinged with yellow and rose, embracing the tube of the inner series, which is reduced to one large segment expanding into a rotundate pure white, plicately undulated *limb*, yellow at the base. *Filament* broad, bearing one very large ovate pointed *anther*, pointing downwards, deeply two-lobed, above which the filament is prolonged into one short ovate erect segment and two lateral spreading linear-oblong ones. On each side the base of the filament we find two subulate processes. *Ovary* inferior, cylindrical, a little downy. *Style* long, filiform, passing between the lobes of the anther, and terminating there in an infundibuliform stigma. *Capsules* admirably represented in Pereira, two or three in a cluster at the end of the short scaly stipes, scarcely two inches long, powerfully aromatic, ovato-lanceolate, acuminated, brown, striated (as if shrivelled), terminated by withered portions of the perianth. *Seeds* very hot and acrid. *W. J. H.*

CULT.—This plant, being a native of the tropics, requires a warm stove, and grows freely in a mixture of light loam and peat-soil. Like others of the family to which it belongs, it has a season of rest, which is indicated by the stem and leaves beginning to fade; water should then be sparingly given. In spring it should be repotted in fresh soil. It is readily increased by division of the roots. *J. S.—Botanical Magazine.*

ON THE LEAVES OF ARCTOSTAPHYLOS UVA-URSI.

BY A. KAWALIER.

THE following observations on the leaves of Arctostaphylos Uva-Ursi contain the results of experiments performed by Kawalier, in the laboratory of F. Rochleder.

The watery decoction of the leaves yields with a solution of sugar of lead a precipitate, which consists of nearly pure gallate of lead. The liquid filtered from the lead was distilled in a retort to the consistency of a syrup, and a small quantity of precipitated salt of lead removed by filtration. The filtrate was then deprived of the lead by sulphuretted hydrogen, and evaporated at a heat below the boiling point. After a few days a substance known by the name of *arbutin* crystallized from it in the form of needles.

Purified by recrystallization it is in long, thin, colourless, bitter prisms, which dissolve in alcohol, in ether, and in water, fuse when heated, and solidify into an amorphous mass. In the air-dried condition the crystals of arbutin were composed of $C_{25}\ H_{34}\ O_{19}$. When dried at 100° C., the formula is $C_{26}\ H_{32}\ O_{18}$, the crystals retaining their shape unaltered. Dissolved in water with emulsin they become decomposed. If the liquid be evaporated and the residue treated with ether, a substance is dissolved by the latter, which, when the ether is removed by evaporation, remains behind in a crystallized state. This is *arctuvin*. The residue treated by ether contains grape-sugar, which is separated from the emulsin by alcohol, and purified by recrystallization from water. The formula of arctuvin is $C_{26}\ H_{16}\ O_{7}$. Air-dried arbutin $= C_{26}\ H_{16}\ O_7 + C_{12}\ H_{14}\ O_{14} = C_{38}\ H_{30}\ O_{21}$. Arbutin dried at 100° C. $= C_{26}\ H_{16}\ O_7 + C_{12}\ H_{16}\ O_{12}$.

The arctuvin can be obtained by recrystallizing it from spirit of wine and water, and treating the solution with animal charcoal in the form of four-sided, colourless, bitter sweet acicular crystals, of four to six inches in length and two to three inches in width. From diluted aqueous solutions, which have not been completely decolourized, it is obtained in the form of brown crystals, one inch in length and half an inch in thickness. According to its composition it may be considered as the

product of oxidation of a substance, the composition of which is equal to that of camphor. $C_{26}\ H_{16}\ O_2 + O_5\ H_4 = C_{20}\ H_{16}\ O_7$.

2 equiv. of camphor.

A watery solution of the crystals, mixed with a solution of chloride of iron, assumes an indigo-blue colour; after a few seconds this changes to green, and then to brownish-yellow. This reaction indicates a connexion with the salicyle group, and the arctuvin might, perhaps, be considered as a salicylite of the oxide of ethyle, combined with the elements of oxalic acid.

$$C_{14}\ H_{10}\ O_2 = C_2\ O_3 + C_4\ H_4O + C_{18}\ H_8\ O_2.$$

It is well known that *Gaultheria procumbens* (fam. of Ericineæ) contains salicylate of the oxide of methyle in combination with a substance at present unknown. Arbutin brought in contact with the vapour of ammonia and with atmospheric air assumes a slightly blueish colour. In contact with the atmosphere and ammonia it becomes black. The ammoniacal compound thus formed is composed of

$$C_{50}\ H_{18}\ N_3\ O_{10}.$$

Arctuvin is very easily changed by oxidizing bodies and coloured brown by a mere cold solution of bichromate of potash.

Besides gallic acid the leaves of uva-ursi contain also fat, wax, and chlorophylle, a small proportion of sugar, traces of an ethereal oil, and small proportions of a substance which, if heated with diluted sulphuric or muriatic acid, yields an ethereal oil, which readily attracts oxygen from the air and becomes dark coloured. This oxydized oil has the formula $= C_{20}\ H_{14}\ O_5$. In addition to these substances the aqueous extract of the leaves contains also a resinous substance, which is obtained by heating the extract with sulphuric or muriatic acid, and purifying by solution in alcohol and precipitation with water. Its composition corresponds with the formula $C_{36}\ H_{30}\ O_{16} = H\ O. \quad C_{36}\ H_{24}\ (= 8\ C_{18}\ H_6) - H_{30} + O_{30} + C_{36}\ H_{54}\ O_{30}$.—*Annalen d. Chem und Pharm.*, May, 1852, p. 241.

OBSERVATIONS UPON A GENERAL METHOD FOR DETECTING THE ORGANIC ALKALOIDS IN CASES OF POISONING.

BY PROFESSOR STAS, OF BRUSSELS.

WHATEVER certain authors may have said on the subject, it is possible to discover in a suspected liquid all the alkaloids, in whatever state they may be. I am quite convinced that every Chemist who has kept up his knowledge as to analysis, will not only succeed in detecting their presence, but even in determining the nature of that which he has discovered, provided that the alkaloid in question is one of that class of bodies, the properties of which have been suitably studied. Thus he will be able to discover conia, nicotine, aniline, picoline, petinine, morphine, codeine, narcotine, strychnine, brucine, veratrine, colchicine, delphine, emetine, solanine, aconitine, atropine, and hyoscyamine. I do not pretend to say that the chemical study of all these alkaloids has been sufficiently well made to enable the experimenter who detects one of them to know it immediately, and affirm that it is such an alkaloid, and not such another. Nevertheless, in those even which he cannot positively determine or specify, he may be able to say that it belongs to such a family of vegetables—the Solanaceæ, for example. In a case of poisoning by such agents, even this will be of much importance. The method which I now propose for detecting the alkaloids in suspected matters, is nearly the same as that employed for extracting those bodies from the vegetables which contain them. The only difference consists in the manner of setting them free, and of presenting them to the action of solvents. We know that the alkaloids form acid salts, which are equally soluble in water and alcohol; we know also that a solution of these acid salts can be decomposed so that the base set at liberty remains either momentarily or permanently in solution in the liquid. *I have observed that all the solid and fixed alkaloids above enumerated, when maintained in a free state and in solution in a liquid, can be taken up by ether when this solvent is in sufficient quantity.* Thus, to extract an alkaloid from a suspected substance, the only problem to resolve consists in separating, by the aid of simple means, the foreign matters, and then to find a base which, in rendering the alkaloid free, retains it in solution, in order that the ether may extract it from the liquid. Successive treatment by water and alcohol of different degrees of concentration, suffices for separating the foreign matters, and obtaining in a small bulk a solution in which

the alkaloid can be found. The bicarbonates of potash or soda, or these alkalies in a caustic state, are convenient bases for setting the alkaloids at liberty, at the same time keeping them wholly in solution, especially if the alkaloids have been combined with an excess of tartaric or of oxalic acid.

To separate foreign substances, animal or otherwise, from the suspected matters, recourse is commonly had to the tribasic acetate of lead, and precipitating the lead afterwards by a current of sulphuretted hydrogen. As I have several times witnessed, this procedure has many and very serious inconveniences. In the first place, the tribasic acetate of lead, even when used in large excess, comes far short of precipitating all the foreign matters; secondly, the sulphuretted hydrogen, which is used to precipitate the lead, remains in combination with certain organic matters which undergo great changes by the action of the air and of even a moderate heat; so the animal liquids which have been precipitated by the tribasic acetate of lead, and from which the lead has been separated afterwards by hydrosulphuric acid, colour rapidly on exposure to the air, and exhale at the same time a putrid odour, which adheres firmly to the matters which we extract afterwards from these liquids. The use of a salt of lead presents another inconvenience, viz., the introduction of foreign metals into the suspected matters, so that that portion of the suspected substance is rendered unfit for testing for mineral substances. The successive and combined use of water and alcohol at different states of concentration, permits us to search for mineral substances, whatever be their nature, so that in this way nothing is compromised, which is of immense advantage when the analyst does not know what poison he is to look for.

It is hardly necessary to say, that in medico-legal researches for the alkaloids, we ought never to use animal charcoal for decolourizing the liquids, because we may lose all the alkaloid in the suspected matters. It is generally known that animal charcoal absorbs these substances at the same time that it fixes the colouring and odoriferous matters.

[This is no doubt true; we must not use animal charcoal to decolourize, and then look for the alkaloid in the *liquid*, but we may use it, at least in the case of strychnia and some of the non-volatile alkaloids, to separate them, and then we look for them *in the charcoal*. See notice of Graham and Hofmann's Process for Detecting Strychnia: *Monthly Journal*, August, 1852, p. 140; *Pharmaceutical Journal*, vol. xi. p. 504, May, 1852.]

The above observations do not proceed from speculative ideas only, but are the result of a pretty long series of experiments which I have several times employed for discovering these organic alkaloids. To put in practice the principles which I have thus explained, the following is the method in which I propose to set about such an analysis:—I suppose that we wish to look for an alkaloid in the contents of the stomach or intestines; we commence by adding to these matters twice their weight of pure and very strong alcohol;* we add afterwards, according to the quantity and nature of the suspected matter, from ten to thirty grains of tartaric or oxalic acid—in preference tartaric; we introduce the mixture into a flask, and heat it to 160° or 170° Fahrenheit. After it has completely cooled it is to be filtered, the insoluble residue washed with strong alcohol, and the filtered liquid evaporated in vacuo. If the operator has not an air-pump, the liquid is to be exposed to a strong current of air at a temperature of not more than 90° Fahrenheit. If, after the volatilization of the alcohol, the residue contains fatty or other insoluble matters, the liquid is to be filtered a second time, and then the filtrate and washings of the filter evaporated in the air-pump till nearly dry. If we have no air-pump, it is to be placed under a bell-jar over a vessel containing concentrated sulphuric acid. We are then to treat the residue with cold anhydrous alcohol, taking care to exhaust the substance thoroughly; we evaporate the alcohol in the open air at the ordinary temperature, or still better, in vacuo; we now dissolve the acid residue in the smallest possible quantity of water, and introduce the solution into a small test-tube, and add little by little pure powdered bicarbonate of soda or potash, till a fresh quantity produces no further effervescence of carbonic acid. We then agitate the whole with four or five

* When we wish to look for an alkaloid in the tissue of an organ, as the liver, heart, or lungs, we must first divide the organ into very small fragments, moisten the mass with pure strong alcohol, then express strongly, and by further treatment with alcohol exhaust the tissue of everything soluble. The liquid so obtained, is to be treated in the same way as a mixture of suspected matter and alcohol.

times its bulk of pure ether, and leave it to settle. When the ether swimming on the top is perfectly clear, then decant some of it into a capsule, and leave it in *a very dry place* to spontaneous evaporation.

Now, two orders of things may present themselves; either the alkaloid contained in the suspected matter is liquid and volatile, or solid and fixed. I shall now consider these two hypotheses.

Examination for a Liquid and Volatile Alkali.

We suppose there exists a liquid and volatile alkaloid. In such a case, by the evaporation of the ether, there remains in the inside of the capsule some small liquid striæ which fall to the bottom of the vessel. In this case, under the influence of the heat of the hand, the contents of the capsule exhale an odour more or less disagreeable, which becomes, according to the nature of the alkaloid, more or less pungent, suffocating, irritant; it presents, in short, a smell like that of a volatile alkali masked by an animal odour. If we discover any traces of the presence of a volatile alkaloid, we add then to the contents of the vessel, from which we have decanted a small quantity of ether, one or two fluid drachms of a strong solution of caustic potash or soda, and agitate the mixture. After a sufficient time, we draw off the ether into a test-tube; we exhaust the mixture by two or three treatments with ether, and unite all the ethereal fluids. We pour afterwards into this ether, holding the alkaloid in solution, one or two drachms of water, acidulated with a fifth part of its weight of pure sulphuric acid, agitate it for some time, leave it to settle, pour off the ether swimming on the top, and wash the acid liquid at the bottom with a new quantity of ether. As the sulphates of ammonia, of nicotine, aniline, quinoleine, picoline, and petinine, are entirely insoluble in ether, the water acidulated with sulphuric acid contains the alkaloid in a small bulk, and in the state of a pure sulphate; but as the sulphate of conia is soluble in ether, the ether may contain a small quantity of this alkali, but the greater part remains in the acidulated watery solution. The ether, on the other hand, retains all the animal matters which it has taken from the alkaline solutions. If it on spontaneous evaporation leaves a small quantity of a feebly-coloured yellowish residue, of a repulsive animal odour, mixed with a certain quantity of sulphate of conine, this alkaloid exists in the suspected matter under analysis. To extract the alkaloid from the solution of the acid sulphate, we add to the latter an aqueous and concentrated solution of potash or caustic soda, we agitate and exhaust the mixture with pure ether; the ether dissolves ammonia, and the alkaloid is now free. We expose the ethereal solution at the lowest possible temperature to spontaneous evaporation; almost all the ammonia volatilizes with the ether, whilst the alkaloid remains as residue. To eliminate the last traces of ammonia, we place for a few minutes the vessel containing the alkaloid in a vacuum over sulphuric acid, and obtain the organic alkaloid with the chemical and physical characters which belong to it, and which it is now the Chemist's duty to determine positively.

I applied, on the 3d March, 1851, the process which I have described, to the detection of nicotine in the blood from the heart of a dog poisoned by two cubic centimetres [0.78 C.I.] of nicotine introduced into the œsophagus, and I was able in a most positive manner to determine the presence of nicotine in the blood. I was able to determine its physical characters, its odour, taste, and alkalinity. I succeeded in obtaining the chloro-platinate of the base perfectly crystallized in quadrilateral rhomboïdal prisms of a rather dark yellow colour, and to ascertain their insolubility in alcohol and ether.

I have applied the same process for the detection of conia in a very old tincture of hemlock, which my friend and colleague M. de Hemptinne was so kind as to put at my disposal; and I was equally successful in extracting from the liquid colourless conia, presenting all the physical and chemical properties of this alkali. I was also able to prove that the ether which holds conia in solution, carries off a notable portion of this alkaloid when the solvent is exposed to spontaneous evaporation.

Examination for a Solid and Fixed Alkaloid.

Let us now suppose that the alkali is solid and fixed; in that case, according to the nature of the alkali, it may happen that the evaporation of the ether resulting from the treatment of the acid matter, to which we have added bicarbonate of soda, may leave or not a residue, containing an alkaloid. If it does, we add a solution of

caustic potash or soda to the liquid, and agitate it briskly with ether. This dissolves the vegetable alkaloid, now free and remaining in the solution of potash or soda. In either case, we exhaust the matter with ether. Whatever be the agent which has set the alkaloid free, whether it be the bicarbonate of soda or potash, or caustic soda or potash, it remains, by the evaporation of the ether, on the side of the capsule as a solid body, but more commonly a colourless milky liquid, holding solid matters in suspension. The odour of the substance is animal, disagreeable, but not pungent. It turns litmus paper permanently blue.

When we thus discover a solid alkaloid, the first thing to do is to try and obtain it in a crystalline state, so as to be able to determine its form. Put some drops of alcohol in the capsule which contains the alkaloid, and leave the solution to spontaneous evaporation. It is, however, very rare that the alkaloid obtained by the above process is pure enough to crystallize. Almost always it is soiled by foreign matters. To isolate these substances, some drops of water, feebly acidulated with sulphuric acid, are poured into the capsule, and then moved over its surface, so as to bring it in contact with the matter in the capsule. Generally we observe that the acid water does not moisten the sides of the vessel. The matter which is contained in it separates into two parts, one formed of greasy matter, which remains adherent to the sides—the other alkaline, which dissolves and forms an acid sulphate. We cautiously decant the acid liquid, which ought to be limpid and colourless, if the process has been well executed; the capsule is well washed with some drops of acidulated water, added to the first liquid, and the whole is evaporated to three-fourths in vacuo, or under a bell-jar over sulphuric acid. We put into the residue a very concentrated solution of pure carbonate of potash, and treat the whole liquid with absolute alcohol. This dissolves the alkaloid, while it leaves untouched the sulphate of potash and excess of carbonate of potash. The evaporation of the alcoholic solution gives us the alkaloid in crystals.

It is now the Chemist's business to determine its properties, to be able to prove its individuality. I have applied the principles which I have just expounded to the detection of morphine, iodine, strychnine, brucine, veratrine, emetine, colchicine, aconitine, atropine, hyoscyamine—and I have succeeded in isolating, without the least difficulty, these different alkalies, previously mixed with foreign matters.

I have thus been able to extract, by this process, morphine from opium, strychnine and brucine from nux vomica, veratrine from extract of veratrum, emetine from extract of ipecacuanha, colchicine from tincture of colchicum, aconitine from an aqueous extract of aconite, hyoscyamine from a very old extract of henbane, and atropine from an equally old tincture of belladonna. Thus it is in all confidence that I submit this process to the consideration of Chemists who undertake medico-legal researches.—*Bulletin de l'Académie Royale de Médecine de Belgique*, tom. vi., No. 2; *and Edinburgh Monthly Journal of Medical Science.*

ON THE OCCURRENCE OF TRIMETHYLAMIN IN HERRING-PICKLE.

Trimethylamin forms the principal component among the number of various bases contained in herring-pickle (herring-brine). The basis was identified by Henry Winkle, not only by comparing it with the synthetically obtained trimethylamin, but also by its relation to iodide of methyle, with which it solidified instantaneously into a crystalline mass of *tetramethylammoniumiodid*.—*Annalen d. Chem. und Pharm.*, Bd. lxxxiii., Hft. 1, p. 116.

DECOMPOSITION OF NITRATE OF SILVER IN PILLS.

BY MR. J. W. ORTON,
Registered Apprentice of the Pharmaceutical Society.

Will you permit me to call your attention to a fact that recently came under my notice. I need scarcely remark that the practice prevails of prescribing nitrate of silver to be made into pills with crumb of bread. It was while dispensing such a prescription that I observed that the almost immediate effect of bringing these two compounds into contact, was to *convert* the nitrate into *chloride* of silver. This result is to be attributed to the presence (in the bread) of common salt, and the chlorides contained in the water.

What I desire to submit for consideration, is this: Is it or is it not material whether the silver salt be administered as a nitrate instead of a chloride? If this be desirable, should not some substance congenial with nitrate of silver be substituted for bread? For instance, tragacanth powder, and a few drops of *distilled* water.

Brighton, 35, *North Street*, *Sept.* 12, 1852.

[The suggestion is worthy of attention, but the objection to tragacanth is that it becomes very hard and difficult of solution by keeping. When a medical practitioner orders nitrate of silver to be made into pills with bread, he is of course responsible for any decomposition which may ensue.—Ed.]

SACCHARIZED HYDRATE OF MAGNESIA.

A preparation under this name has been introduced by Mr. White, of Cork, who describes it as consisting of "pure hydrate of magnesia uncombined with any acid, and in the finest gelatinous state," sweetened with sugar, and flavoured with an aromatic. Each ounce contains a quantity of magnesia equivalent to twenty grains of the carbonate. This is a convenient form in which to administer magnesia, especially to children, as it is not at all disagreeable; and the magnesia being in suspension, there is no sediment.

CASE OF SUPPOSED POISONING BY BATTLEY'S SOLUTION OF OPIUM, INJECTED INTO THE RECTUM.

On Saturday, 18th September, an inquest was held by Mr. Wakley, on the body of the Hon. Major Charles R. W. Forester, aged forty-one, who had died at 6, Cavendish Square, early on the morning of Thursday, the 16th, after using an opiate enema, prescribed by Mr. Richard Dawson, of 15, Finsbury Circus. Mr. Clarkson appeared on behalf of Mr. Dawson. The inquiry was not completed, and the inquest was adjourned to the 28th, but from the evidence and what transpired in the room, we learned that the deceased gentleman had for several months been undergoing hydropathic treatment; that he had afterwards put himself under the care of a homœopathic practitioner; and latterly, conceiving himself to be affected with *spermatorrhœa*, had applied for assistance to Mr. or Dr. Dawson, author of a work on that disease, and, as our readers may remember, the subject of encomiums in a pamphlet extensively distributed some years ago by a certain disinterested Mr. Teevan, the victim of a set of unscrupulous quacks, whom he denounces, all to the manifest advantage of Mr. Dawson. It appeared that on the morning preceding his death, after eating a hearty breakfast and being in his usual state of health, Major Forester paid a visit to Mr. Dawson in the city, and when he returned about two hours afterwards he complained of suffering acute pain, the result of an operation he had undergone. He had to be assisted to his bed-room, had a warm hip-bath, and at two o'clock P.M. sent to Messrs. Savory, of Bond Street, with a verbal message requesting them to send thirty grains of Dover's powder, a syringe, and an enema, to be composed according to the following prescription of Mr. Dawson:—

℞ Liquor Opii. Sedativ ℥ij.
Tinct. Opii. Camphor ʒss.
Mucil. ℥ij.
Spir. Camph. ℥xx.
Ft. Enema. R. D.

Mr. Savory refused to supply the Dover's powder without a written order, but sent the enema prescribed, with a gum-bottle. In less than two hours a written order for fifteen grains of Dover's powder was received, with a request that a fresh

supply of the enema, with a different instrument, should be sent, as the patient had failed in using the gum-bottle. In delivering the fifteen grains of Dover's powder, Mr. Savory cautioned the servant by telling him that the paper contained what was equal to three doses; he also gave him another bottle of the enema and a pewter syringe. The evidence of the wife of the deceased not having been taken, it did not come out clearly at what time part of the Dover's powder was taken, or when the second supply of the injection was used. It was stated by the valet that about eight his master had tea and partook of a muffin, and that a little before nine he was summoned to remove a basin which he supposed to have been used in throwing up the injection. In the bottom of the basin he observed a little of the enema; there was also a small quantity of it in the syringe, and a little had been spilled on the carpet. The servant did not see the deceased after this till eleven o'clock, when he appeared in his ordinary health. He told the servant that they would not have prayers, and that he might go to bed. In less than ten minutes afterwards the bell rang with violence, and the valet was ordered by the deceased's wife to bring immediately the first medical gentleman to be found in the neighbourhood.

Dr. Halley, of Queen Anne Street, reached the house within a few minutes. He found the patient reclining on the sofa, in a profuse perspiration, his eyes closed, breathing tranquil, his countenance pale, and of a slightly leaden hue; when loudly spoken to and shaken, he became partially conscious, but he never spoke; the pupils were in a middle state between dilatation and contraction, and contracted under the influence of a strong light. Dr. Halley was informed that the gentleman had undergone an operation in the forenoon, and the paper containing the Dover's powder was shown, with only a part, estimated to be eight grains, removed from it. Dr. Halley kept bathing the temples and forehead with cold water for above an hour, and gave him brandy and ammonia; the patient gradually became more conscious, but did not speak in reply to questions. Before leaving, Dr. Halley strongly urged the importance of his being instantly sent for, should the sleep become more deep, or any new symptom present itself; and on his reaching home, he put out his stomach-pump with other things, in readiness, in case he should be called. It was not till four hours afterwards, viz., at half-past four, that he was summoned, and on hastily repairing to the house, he found the patient dead. The stomach-pump was used, but no smell of opium was detected in what came away; and there were no signs of returning animation. Dr. Halley was now shown, for the first time, the prescription, above copied, for the enema, and he also found a six-drachm phial, which contained half of the quantity of the injection that had been prescribed, and these he took possession of. The melancholy occurrence having been notified to the coroner, an order was given for a *post-mortem* examination, and Mr. Shaw, Surgeon to the Middlesex Hospital, was requested to assist Dr. Halley. It may be shortly stated, that throughout the whole body, every organ of which was carefully examined, no morbid lesion was found, except in the urethral orifice of the bladder, where a circular portion of the mucous membrane, the third of an inch in diameter, was converted into a thin dead film or superficial eschar, exactly like the effect of a touch of lunar caustic; a congeries of small blood vessels concentrated round this eschar; the mucous membrane of the trigone was highly vascular, and the same membrane in the bladder generally, was marked with patches of vascular spots; but all the above appearances were manifestly of recent origin, and were presumed to be the consequences of the operation alleged to have been performed on the patient on Wednesday forenoon; the prostate vesiculæ seminales, and urethra were quite sound. The rectum was contracted, the mucous membrane healthy, and in the small quantity of fæces which remained there was no smell of opium. The only abnormal changes met with in the other organs were from congestion of the blood, which was fluid throughout, except in the inferior vena cava, and in both ventricles of the heart, where small, soft, imperfectly coagulated clots were found; both lungs were much gorged with blood, particularly in their inferior lobes and posteriorly; the brain was but moderately congested; the mucous membrane of the stomach was healthy.

The chief cause of the adjournment of the inquest was said to be the doubt entertained by the coroner, whether so small a quantity of opium as was proved by the evidence to have been taken by the patient could produce death, and instructions were given for a chemical examination to be made. According to the facts stated, it appeared that the deceased gentleman had swallowed eight grains of Dover's powder; it moreover appeared, that in injecting the enema, only half of the quantity prescribed had been taken from the bottle, and that of that half, he spilled some on the carpet and into the basin, and some was retained in the syringe. It therefore did not seem probable that more than half a drachm, if so much, of the Battley's solution of opium prescribed in this enema was received into the rectum. Before the question can be satisfactorily answered whether such a quantity of opium so administered, partly by the mouth and by the rectum, can produce death (for the mode of death, as well as the *post-mortem* appearances, corresponded with those of fatal narcotism from opium), two points have to be attended to: one that belongs more particularly to the province of the medical man; viz., does opium injected into the rectum produce its narcotic effects more powerfully than if taken into the stomach; a great Surgeon, Baron Dupuytren, has stated his opinion that such is the case; and the other point, relating more particularly to the objects of this Journal is, "What is the true strength of Battley's solution of opium?" When that question was put at the inquest to Mr. Savory's assistant, who dispensed the injection, he answered, without hesitation, that it was of the same strength as tinctura opii, and the answer was received without any observation or objection. Now there are some writers, referred to in Dr Taylor's work upon Poisons, who consider the Liquor Opii Sedativus to be *three times* as strong as Tinctura Opii. Dr. Christison describes it as one-third stronger than the tincture. Is it creditable that such doubts should exist about the strength of a preparation so generally prescribed by our most eminent practitioners?

DEATH OF BUCHNER.

Dr. Buchner, Sen., the highly distinguished and learned Pharmaceutist, and editor of the *Repertorium für Pharmacie*, is no longer among the living! He died peacefully, as he had lived, on the 6th of June, shortly after midnight, in his 70th year, after a protracted illness; and his loss will not only be deeply felt by his relations and friends, by his native town, and the Royal University, of which he was the greatest ornament, but also by the whole scientific world. The greatest grief was particularly manifested at the funeral, which took place in the evening of the 8th of June, and which, besides being attended by his numerous relations, friends, and pupils, by the Members of the Royal University, and of the Academy of Science, and by all the Physicians and Apothecaries of Munich, was also followed by a large number of persons of all classes. At the grave the subjoined address was delivered by the Court Apothecary and Professor Pettenkofer. At the late anniversary of the Royal University also, and likewise at other meetings, addresses were delivered in memory of the deceased, eulogizing his prominent and rare virtues and merits.

Address delivered at the Funeral of Dr. Buchner, on the 8th of June, 1852, by Dr. Max Pettenkofer, Royal Court Apothecary, and Professor at the University.

The Medical Society of Munich has established the praiseworthy custom of pronouncing at the funeral of each of its departed members, after the sacred rites of the church have been performed, and before the grave is closed for ever, a few commemorative words in honour of the deceased. Fate has settled it, that of late years this melancholy duty should be exclusively performed towards professors of the medical faculty. The earth rests yet fresh upon Walther, Schneemann and Breslau, when we find ourselves again assembled around the open grave of one of our colleagues. And because death places all men on one level, it is a natural impulse to avail ourselves of the solemn silence that surrounds the grave of our lamented friend, in order to praise aloud his life, to raise him, as it were, once more in his entire greatness before we confide him for ever to his mother-earth.

Johann Andreas Buchner, Doctor of Philosophy, of Medicine, and of Pharmacy, Professor of Medicine, Member of the Medical Faculty, and President of the Pharmaceutical Institution at the Royal University of Munich, Member of the Royal Bavarian Academy of Sciences, Knight of the Ordre pour le Mérite of St. Michael, member of several foreign academies and learned societies, &c., was the son of a private gardener, and was born at Munich on the 6th of April, 1783. With a simple unartificial education, he displayed at a very early age great abilities and desire for study, in consequence of which his parents placed him at the Gymnasium and Lyceum of Munich. Being chiefly inclined to the study of the natural sciences, he went in the year 1803 as apprentice to the late Apothecary Ostermaier, his friend

and brother-in-law; and from the latter, in 1805, to the celebrated Trommsdorff, of Erfurt, with whom he afterwards was connected by ties of the most intimate friendship. In the year 1807 he took at the then existing University of Erfurt the degree of Dr. Philosoph., and was two years later appointed chief Apothecary at the new established Central-Stiftungs-Apotheke of Munich, where it was part of his duty to attend regularly the Physicians in the various wards, in order to take down the prescriptions. Dr. Buchner availed himself of this opportunity, and applied himself assiduously but privately to the study of medicine, and what he had seen and heard in the sick-ward became the subject of his studies during his leisure hours.

In the year 1814 Dr. Buchner interested himself very much in the foundation of the Pharmaceutical Society of Bavaria, and undertook the office of secretary, which he retained till 1818, when he left Munich. It was also in the year 1815 that the publication of his *Repertorium für die Pharmacie* commenced; a journal known throughout the whole Continent, and which at the death of its editor had reached the number of more than 100 volumes. Most of the chemical and pharmaceutical researches of Dr. Buchner, which he undertook partly alone, partly with the co-operation of his scientific friends, and which are too many to be enumerated here, are contained in this journal. Besides this, Dr. Buchner published several other scientific works on Pharmacy, of which especially his *Vollständiger Inbegriff der Pharmacie*, published by him in connexion with other learned men, has unfortunately not been yet completed, received the most favourable reception. When the secretary of the Academy of Sciences in Munich, Von Schlichtegroll, determined in the year 1815 to realize the idea of a Polytechnic Society for Bavaria, Dr. Buchner took the most active share in promoting this institution; he was the first secretary of the managing committee of the society, and undertook the editorship of the organ of the society, which, under the title of *Kunst und Gewerbeblatt für des Konigreich Bayern* is one of its greatest ornaments.

In the year 1817 Dr. Buchner was appointed member of the Royal Medical Commission, and in 1818 adjunct of the Academy of Sciences, which afterwards elected him, in the year 1827, extraordinary member, and in 1844 member of the physico-mathematical division.

In 1818 the deceased received a call to the University of Landshut, as Professor of Pharmacy and Toxicology, where he continued during the first years of his professorship his medical studies with great zeal; he practised assiduously in the anatomical theatre, attended lectures and the hospitals in order to prepare himself for taking the degree of M.D., and undertook in the year 1820, supported by royal patronage, a journey to Paris in order to visit the medical and other scientific institutions of that city. In the year 1819, on the 14th of August, when the Medical Faculty of the Royal Rhenish University of Bonn bestowed for the first time since its foundation the degree of M.D., it proclaimed of its own accord Professor Buchner, of Landshut, a doctor of Medicine and Pharmacy, whereupon he was appointed, in 1822, Regius Professor of Pharmacy to the Medical Faculty, which induced him to decline a very honourable call to the university of Freiburg, in the Grand Duchy of Baden, which had just then reached him.

When the university of Landshut was transferred in the year 1826 to Munich, Dr. Buchner entered again his native town, where, on account of the practical instruction in the laboratory, the number of his pupils increased to such a degree that, Berlin excepted, at no university a greater audience was ever met with in a pharmaceutical lecture-room.

In the year 1842-43 Dr. Buchner was rector of the university of Munich, and in 1848 he was received by his Majesty the King among the number of Knights of the Ordre pour le Mérite of St. Michael.

Dr. Buchner leaves a widow and three sons—sons, who already matured to men, mourn here with us at the grave of their father and friend. The eldest, L. Andreas, professor at the university and member of the Academy of Sciences at Munich, has acquired already great celebrity in the chemical world; the second, Xavir, is in practice as a Physician; and the third, Carl, manufacturer of chemical products in Munich. The callings of these three distinguished men significantly reflect the threefold activity of the father, who succeeded in uniting within himself the chemical, medical, and technical sciences.

I have now laid before this highly respected assembly the life of Buchner, in dry, unornamented outlines. This sketch is as cold and lifeless as his body now is. We can nevertheless enliven it by the warmth of our feelings. It was a long road from the gardener's boy to the dignity of rector magnificus of one of the first universities in Germany, which our lamented friend and brother had to pass; the road was so difficult that his energies must have been uncommon not to have succumbed before reaching the goal. Dr. Buchner was no hothouse plant, that required anxious nursing—he was made for the rough soil of life, whose varying heat and cold, drought and moisture, he experienced, blooming and bearing fruit. Dr. Buchner belonged to the number of those men whose zeal is not to be enhanced by praise and flattery, by the vile allurements of ambition, nor to be slackened by unmerited criticism and indifference. After having once chosen a certain profession, that of Pharmaceutist, he was to the end of his active life prompted in all his movements by one single idea,—by the idea of ennobling the trade of the Pharmaceutist on strictly scientific foundations. This object he had before him when he went to Trommsdorff, at Erfurt, with this view he visited the hospitals at Munich, where he not only dispensed medicines, but also watched their effect upon the patient; this same idea urged him to the earnest study of Chemistry, as the principal foundation of technical Pharmacy, which gave him strength to continue his voluminous *Repertorien für Pharmacie*—it was this idea which induced him to accept the pharmaceutical professorships at Landshut and Munich, and which guided him in all his labours relating to the art of the Pharmaceutist. Long before his death he had reached the goal as victor, and many a laurel crowned his modest brow. Not only did the Academy of Sciences at Munich elect him as its member, but many foreign academies and learned societies did the same. He filled at our university several times the office of Dean of the Medical Faculty, and was, as has been already mentioned, in the year 1842-43 Rector Magnificus. His pupils loved and esteemed him in an uncommon degree, and not only the Pharmaceutists of his native country, but also those abroad, considered him as their chief. When, in 1843 Dr. Buchner visited Vienna, he was welcomed on board the steamer by all the Pharmaceutists of that capital, who vied with one another in making for him each day of his residence there a feast.

This and similar success could neither rouse pride nor a desire for inactive enjoyment in the heart of the deceased. In his indefatigable but quiet noiseless activity, he may be compared to a tree that blooms and brings fruit, unmindful whether they be consumed or not—it fulfils the destination of its existence, till its Creator causes the roots to dry up, and the decayed trunk falls to ruins.

This last extraordinary activity Dr. Buchner displayed as member and afterwards as President of the commission, appointed by His Majesty in the year 1849 for the publication of a new *Pharmacopœia Bavarica*. Particularly in the latter time, our departed friend and brother was urged by a vague and harassing feeling, which we are often inclined to call a foreboding of death, to exertions beyond his physical strength. The most uncongenial weather of last winter was unable to prevent him from attending the meetings of the commission, which lasted till late at night, and to return on foot after the finished work, exhausted and breathing hard, to his distant residence.

It was not granted to him to live to see the completion of this work that he had so much at heart, and to which his own hand had contributed so great a share; and Dr. Buchner was the fourth member of the Pharmacopœia Commission who was snatched away by death during its three years' existence.—*Buchner's Neues Repertorium*, Bd. I., Heft 7, p. 342.

TO CORRESPONDENTS.

The present number contains three-quarters of a sheet extra, on account of the length of two original articles, which could not be further curtailed without impairing their value. These articles (namely, on Original Gravities and on the Peruvian Barks), although not of a popular character, are important as contributions to science, and useful for future reference. They will be continued in our next number.

The Pharmaceutical Meetings and School of Pharmacy.—We take this opportunity of reminding Members and Associates, that the second page of the cover of this Journal (at the back of the Table of Contents) is devoted to the official notices of the Pharmaceutical Society. In the above page of the present number will be found Notices of the Commencement of the Pharmaceutical Meetings, and the opening of the School of Pharmacy for the ensuing session.

LIEBIG.—This distinguished chemist has been appointed Conservator of the Chemical Laboratory at Munich, in the place of Dr. August von Vogel, resigned.

A. B. (Leamington).—(1). QUINÆ IODIDUM. Add, by drops, a solution of 24 parts of iodide of potassium in eight parts of water, to a strong solution of 20 parts of bisulphate of quinine. Wash the precipitate quickly, and dry in the shade.—(2). SYRUPUS QUINÆ IODIDI. There is no authorized formula, but it is generally made to contain one grain of the iodide in each fluid drachm.

G. C. L. (Sleaford).—(1). One scruple of carbonate of magnesia requires twenty-seven grains of crystallized citric acid for its decomposition.—(2). Thomson's *Dispensatory*, edited by Dr. Garrod; Squire's *Translation of the London, Edinburgh, and Dublin Pharmacopœias*.

Juvenis (Bawtry).—(1). No.—(2). Wood, when in a state of decay or *eremacausis*, is sometimes luminous in the dark.—(3). Saturated solution of NITRATE OF IRON: R Red oxide of iron ʒiv.; nitric acid, f ʒvj.; dissolve, and add water, f ℥j. Filter.—*Swediam*.

W. W. (Maidstone).—(1). Lindley's *Elements of Botany*, or Balfour's *Manual of Botany*.—(2). To pass the Minor Examination, a knowledge of the London Pharmacopœia, with the elements of Chemistry and Materia Medica, is required. See vol. vii., No. 7.—(3). INCENSE, see vol. ix., pages 344 and 444: olibanum, 2 parts; benzoin, 1 part, are proportions often used.

Æsculapius (Bury).—(1). Noad's *Chemical Manipulation and Analysis*, or Fresenius's *Elementary Instruction in Chemical Analysis*.—(2). Preservation of leeches, see vol. ii., page 537; vol. iii., page 394; vol. ix., page 34.

G. P. S. (Preston) wishes to know the best means of keeping ready-made plasters upon leather. We do not recommend their being kept ready made.

Libra, X. Y. Z., W. H. T., and other Correspondents desiring information respecting admission into the Society, are referred to the first page of the present number. For a description of the examinations, see vol. vii., No. 7.

Justitiæ Omnibus enquires what are the intentions of the Council with regard to Apprentices and Students not at present connected with the Society? The Council invite them to join the Society, and the Board of Examiners will be glad to receive them. The Board sits on the third Tuesday in the month. See vol. vii., No. 7.

M. P. S. (Shaftesbury).—We have seen the attacks in the Pharmaceutical "satirist," which are curious specimens of "polite literature." We do not however attach any importance to them.

J. W. O. (Brighton). The second part of Balfour's *Class Book of Botany* is not yet published.

M. P. S. (Clare).—We intend to notice the subject next month, if our Correspondent will give us his name in confidence.

Celsus.—We have not the work mentioned to refer to, but conclude that in the formula $v = \sqrt{2gt}$, g represents the mean velocity, and v the final velocity. Thus the space through which a body falls, or its mean velocity for the first second of time, is $16\frac{1}{10}$-feet, but its final velocity at the end of this time is $32\frac{1}{5}$-feet. It may be thus expressed,—if a body were to continue in motion with the final velocity acquired after falling a given time, the operation of gravity being then suspended, the body would descend in a time equal to that during which it had already fallen, with a uniform motion through twice the distance of the first fall.

G. (Blackburn).—(1.) Amylic alcohol gives a peculiar disagreeable flavour to rectified spirit. It is separated by distillation, after digesting the spirit with carbonate of potash.—(2.) Strong solution of caustic potash is made by evaporating liquor potassæ in a silver vessel.

R.—Electrotypes may have a bronze colour given to them by brushing them over with solution of chloride of platinum.

A. B.—We have not the formula for Morrell's ink.

Studiosus—Lindley's *Medical and Œconomical Botany*.

A. B. C.—The last-named formula is the best.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. CHURCHILL, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XII.—No. V.—NOVEMBER 1st, 1852.

THE ADOPTION OF THE TITLE "PHARMACEUTICAL CHEMIST."

AT a Meeting of Chemists and Druggists at Birmingham (reported page 218), a resolution was passed recommending the adoption of the titles conferred by the Pharmacy Act, on those who are registered according to its provisions. We have received many communications from correspondents on the same subject, and as the operation of the Act consists in the creation of a distinction denoted by certain names and titles, it is important that those who have a right to assume that distinction should come to a mutual understanding as to the time and the mode of publicly and generally adopting it.

In process of time doubts will cease to exist on the subject. Every Member of the Society will, on his election, adopt his newly-acquired titles as naturally as the Physician adopts the letters M.D., or the Fellow of the Royal Society is recognised as F.R.S. The distinction represented by these letters is understood and appreciated, and the desire to enjoy such distinction acts as an inducement to future candidates to qualify themselves. When the nature of the qualification introduced by the Pharmaceutical Society is generally understood by the public, the same universal custom of adopting its characteristic titles will prevail which prevails in the cases before mentioned. To this end it is necessary that the qualification shall be a *bonâ fide* one, and that the public shall be aware of its value. The former object is to be attained by the internal proceedings of the Society which regulate the qualification; the latter, by keeping the titles which represent that qualification prominently before the public.

The suppression of the titles for any considerable time would tend to damp the ardour of some whose ambition to assume the rank which they denote might otherwise serve as a stimulus to exertion in the acquirement of the needful qualification. The too early and ostentatious display of the titles, might give rise to a hypercritical inquiry as to their real value, and rather retard than expedite their general recognition.

The value of the distinction conferred by these titles is, *at the present time*, not absolute but relative. It cannot be assumed that every possessor of the certificate of membership is fully qualified. Neither can it be assumed that every Member is superior in qualification to every person not a Member. It is well known that there are many Chemists not yet connected with the Society who are as qualified for admission as the average of the present Members, and these are the parties to whom a general invitation has been addressed, and on whose behalf bye-laws are framed to facilitate their admission. Between the present time and the month of May next year, there is every reason to believe that a large accession of strength will accrue to the Society by the admission of those who respond to the invitation. The Society will then represent, more correctly than it now does, the regularly educated Chemists and Druggists of this country the term regularly educated being used to imply, not educated according to the system introduced by the Pharmaceutical Society, but regularly brought up to the business in the manner previously recognized and sanctioned by custom. Every year will raise the standard of qualification, as the old Members die or retire and their places are supplied by new Members who have passed the examination. No precise period can be stated at which the Society will emerge from a state of comparative mediocrity to the position which it will ultimately acquire when the certificate of membership will have become an absolute criterion of professional qualification.

During the transition from the rank of Chemists and Druggists of the old

school to that of Pharmaceutical Chemists under the Pharmacy Act, some anomalies and apparent inconsistencies will probably present themselves, and these will assume a greater or less importance according to the aspect under which the entire question is considered. Those who take a comprehensive view of the case, and look upon the Society as a block of marble which is beginning to assume its intended form, but has not yet received the final polish, will perceive that the broad principle is already carried out, and that the exceptional cases and present imperfections are temporary evils not affecting the theory on which the Society is based, and its capability of reducing that theory into practice. Others take a narrow view of the subject. They judge of the Society by its defects, and mistake the exceptions for the rule. Singling out a few individuals whose qualification compared with that of the other Members is below the average, they despise the rank and distinction which is enjoyed alike by these parties and by themselves, and although they continue their membership in anticipation that at some future time it may be advantageous, they are opposed at present to any display of titles or emblems, partly because they dislike what they conceive to be ostentation and quackery, and partly because they look down upon some of their neighbours who are entitled to the same privilege. If the Council, under existing circumstances, were to issue a general recommendation to the Members to adopt and display the titles conferred by the Pharmacy Act, the number responding to such recommendation would convey a disparaging and erroneous idea as to the strength of the Society; first, because many, for the reasons above stated, would not at once respond to it; and, secondly, because a large number who intend to join the Society are not yet admitted, some of whom, although already identified with it as candidates, cannot be admitted until next May. By that time we may expect a large accession of Members, and it has been suggested that it might be advisable to look forward to the next Anniversary in May as the period at which the Parliamentary titles should be generally adopted. In the mean time it is optional with each Member to use his own discretion, and if a considerable number should spontaneously set the example, others would follow it.

The subject will of course claim the attention of the Council, and it will be necessary to arrive at some conclusion before the next anniversary. At that time revised and amended bye-laws will be submitted for confirmation, the door will be closed against the admission of Members by certificate, the proceedings of the Society will acquire a more settled and official character from the fact that its bye-laws will require the confirmation of the Secretary of State, and the Parliamentary distinction will henceforth become more valuable and important.

During the interval, we think each Member should be left to his own unbiassed discretion in reference to the adoption of the titles conferred by the Pharmacy Act.

TO THE PARENTS AND GUARDIANS OF FUTURE PHARMACEUTICAL CHEMISTS.

It may be taken for granted that in the selection of a business or profession for a youth, it is the primary object of his parents or guardians to fulfil this duty in a manner likely to ensure his future success and welfare. For this purpose two essentials must be borne in mind; first, the occupation must be suited to his taste and capacity; secondly, his education and training must be such as to qualify him for the duties he will be called upon to perform. The natural disposition or talent of the individual will sometimes assist in the decision as to his future occupation. It is not necessary, however, that the future Pharmaceutical Chemist should be born a philosopher. A taste for Chemistry may be considered favourable, but this is more often acquired by education than found as a native talent. A restless wandering disposition, a desire for an

active life, and impatience of close confinement, are qualities incompatible with the occupation of a Pharmaceutical Chemist, and a youth having such a disposition would not be likely eventually to follow the business, even if brought up to it. We have known young men, whose parents have paid high apprentice fees and used all their efforts to train them up to Pharmacy, who, at the termination of their apprenticeship, have struck their colours, and sought some other occupation. The life of a Pharmaceutical Chemist is one which tries the patience and exhausts the energy even of those whose disposition is suited to the even tenor and plodding monotony of the shop. To those whose minds are occupied by other tastes and more active pursuits, it is irksome and intolerable. The study of the science of Chemistry and Botany, when taken up *con amore*, affords considerable alleviation to this monotony, and when any degree of proficiency is attained, a wide field of study and research presents itself, which is a continual source of interest and gratification. This, however, depends on the mental endowments of the individual. Two men may walk across a wilderness; one sees nothing but weeds, the other brings home a valuable collection of specimens for his herbarium.

Assuming that these matters have been duly considered, and the decision is in favour of Pharmacy as the future business of the youth, we proceed to the second essential, namely, education. A sound classical education is necessary as a foundation. To bind a boy as an apprentice to a Chemist at the age of 14, with scarcely any knowledge of Latin, and only the rudiments of an ordinary English education, is very reprehensible. If circumstances will not admit of his remaining at school at least a year or two longer to prepare his mind for the subsequent training which a Chemist requires, it would be better to bring him up to a mechanical trade, or some other business more in accordance with his circumstances. Every profession or business has its level; some require an expensive education, others a peculiar kind of talent, others large capital, and those persons who cannot command the resources whether of intellect or of cash required in any particular occupation, should look out elsewhere for another. Hitherto the business of a Chemist and Druggist has been considered in respect to education on a level with the trade of a grocer, oilman, or drysalter. In future, those must possess a superior qualification who aspire to the rank of a Pharmaceutical Chemist.

Supposing the selection to be made, the classical examination passed, and the terms of apprenticeship agreed upon—the premium is paid, and for this consideration the master undertakes to instruct his pupil in the art and mystery of the business of a Pharmaceutical Chemist. His parents probably think they have now done their duty, paid his fare, and started him in the train, his master being responsible for the rest. This is a very common delusion.

In the shop he will learn to fold parcels, fill bottles, make pills and horse-balls, and serve customers. He may get a smattering of Chemistry, and a certain amount of mechanical dexterity in manipulation. At the close of his apprenticeship it will be advisable for him to take a situation for two or three years for the purpose of obtaining more experience in the business before commencing on his own account. We may suppose him to be on his round, provided with introductions to some of the London Chemists, inquiring for a vacancy. He meets with a very eligible situation, and is subjected to a few preliminary inquiries. First, "Are you an Associate of the Pharmaceutical Society?" "No." —"Have you not passed the examination?" "No." This may possibly close the conversation; but in case another chance should be given, a prescription is placed in his hand, with the questions, "What is the chemical composition of the first ingredient?" "How does the Pharmacopœia order it to be prepared?" "What decomposition takes place when these ingredient are mixed?" "What is the usual dose of this tincture, and how much would be a poisonous dose?" He is taken by surprise—he was not prepared for questions of that kind. A few drugs and medicinal plants are shown him, and he is desired to state their

names, general character, and mode of preparation. He is equally at fault, and instead of putting on his apron he resumes his hat. This may occur several times in the course of his round, until he discovers that the payment of an apprentice-fee does not ensure a qualification for his business, and that something more is requisite than the manual dexterity which he has acquired behind the counter. If he had known beforehand what he had to expect, he might have applied himself to study during his apprenticeship. An hour a day devoted to reading, would have paved the way for his future advancement. Although an industrious and diligent apprentice, he has neglected the opportunity. His attention was never directed to the scientific part of his education. No course of study was recommended to him, and no books pointed out as necessary or desirable. By his misfortune, and not his fault, he finds himself, at the close of his apprenticeship, incompetent to take a situation in any of the houses to which he has been advised to apply. Day after day he renews the search, and every evening returns to his lodging, weary and disappointed.

What is to be done? He has staked his all on Pharmacy, and drawn a blank. He is even in a worse position than he might have been if he had, in the first instance, been inoculated with an appreciation of the importance of scientific knowledge, and well advised as to the course of private study which he ought to pursue. He had not this advantage, and he must now make up for lost time. His parents are not prepared for another appeal to the cash-box. They consider that the education of their son has been bought and paid for—that his salary will almost maintain him for two or three years, after which time they have made provision for placing him in business on his own account. They inquire what steps should be taken for the completion of his education, how much time it will occupy, and what expenditure it will entail? Twelve months devoted to study in a practical school of Pharmacy would probably be sufficient. During this time he must not calculate on occupying a situation; his whole time will be employed in the acquirement of knowledge; and the expense for the year, including board and lodging, will certainly be not less than £100, it may amount to £130. We may anticipate the exclamation, "Almost as much as an apprentice-fee!" This reminds us of the exclamation of the father of a youth for whose education Socrates had asked rather a large sum. "I could buy a slave for the amount!" To which Socrates replied, "Buy him, and thou wilt have two." Even supposing the expense of the scientific education to be equivalent to the apprentice-fee, we may ask this question: "If the education of the fingers in the mechanical drudgery of the shop be worth the amount paid as an apprentice-fee, is not the education of the mind in a school of Pharmacy worth at least as much?" The premium paid with an apprentice to an apothecary constitutes a small proportion of the expense of his education. He must devote two or three years to his subsequent studies and hospital practice before he can pass the examinations and receive his diploma. If the Apothecary be required to walk the hospital, why should not the Pharmaceutical Chemist be required to walk the laboratory? It is of no use to evade this question: it may for a time appear an innovation, but it will soon be the necessary condition upon which the rank of Pharmaceutical Chemist can be acquired under the Pharmacy Act.

We are addressing these observations chiefly to parents and guardians who are not connected with the business, and, consequently, are unacquainted with its details, and the course of education required. The sons of Chemists have the advantage of the experience of their parents to guide them; but even Chemists ought to recollect that they must not trust altogether to their own experience, as the kind of education which was considered sufficient at the time they were apprentices, will not satisfy the demands of the profession and the public when their sons have become their successors.

THE ABUSE OF CHEMICAL CERTIFICATES.—THE BEER PUFF.

A LADY who had been for some years in the habit of taking Guinness's Stout, recently informed the agent that she was under the necessity of discontinuing it. On his inquiring whether she had any fault to find with the stout, she replied, "Yes, it is adulterated—if it were not adulterated you would have it analyzed, and publish the certificates as the makers of bitter beer have done; but you dare not have it analyzed, because you know it is adulterated." Assertions and protestations were in vain, the lady closed her account.

The disreputable advantage which has been taken of the strychnia panic as a means of puffing the beer of one brewery in particular, has had a temporary effect on the public mind which is neither creditable to the parties concerned, nor likely in the end to place them in an enviable position in the trade. All the brewers of bitter beer were under an imputation resulting from an unfounded rumour. It was necessary that this should be contradicted, which was done by the publication of the result of a full investigation of the facts of the case, and the quality of the beer from several breweries. Here the matter might have ended. The panic had ceased; the breweries were in full work, and some of them could not make their beer fast enough to meet the demand. One of these firms, however, conceiving this to be a golden opportunity for a puff, has given the public such a dose of advertisements, and certificates, and correspondence respecting the beer of that brewery, that some innocent persons have been led to suspect that the strychnia rumour was, after all, not so ridiculous and unfounded as it had been represented to be. The question is a natural one, "If all this noise and trumpeting be necessary to clear the character of one brewery, what must be the state of the case with other breweries, the proprietors of which are satisfied with a simple contradiction of the rumour, and then leave their beer to trumpet for itself?" The lady above referred to appears to have come to the conclusion that all beer is either puffed or poisoned, and as Messrs. Guinness and Co. will not condescend to puff their stout, she declines to drink it. Others might draw a different inference, founded on the old maxim, that "good wine needs no bush."

Leaving the rival breweries to find their level, we cannot pass unnoticed the injustice perpetrated on the distinguished chemical professors whose names are associated with this system of advertisement. On pumps and posts, dead walls and watering screens, where quacks and impostors plant their puffs, in railway stations, public-houses, and newspapers, hand-bills and circulars, the names of Liebig, Graham, and Hofmann are displayed in large type, in conjunction with the name of the firm which employed them professionally to examine and report upon their beer. If scientific men, in the performance of their ordinary duties as analytical chemists, are to be liable to this annoyance and degradation, it will become necessary for them to be extremely careful to whom they give reports or certificates of this nature. The abuse of chemical certificates is not an unfrequent occurrence, and some Chemists habitually refuse on this account to furnish reports in writing, except under particular circumstances or conditions; but we do not remember a more flagrant case than the one before us. The evil will in some degree cure itself; the beer puff has already produced an effect in checking the facility with which such documents can be obtained. In several instances of recent occurrence they have been refused, and it is not likely after what has occurred that men of the highest eminence, whose opinions are most in request, will furnish written reports without some guarantee or understanding that such reports will not be used in a disreputable manner.

THE SCIENTIFIC INSTITUTIONS OF BIRMINGHAM.

THE connection of science with the arts and manufactures, and the high reputation of Birmingham as a manufacturing town, might lead to the inference that the soil of Birmingham is favourable to science. That this is the case, to

some extent is proved by the skill and ingenuity with which scientific discoveries and inventions are adapted to purposes of practical utility, and made subservient to the wants and luxuries of mankind in the manufactories of that great emporium of industry. In the year 1839, when the Annual Meeting of the British Association for the Advancement of Science was held at Birmingham, the spirit with which the proceedings were conducted, the subjects introduced, the novelties and improvements exhibited as evidence of local talent and practical experience, were highly creditable to the town of Birmingham and interesting to the scientific visitors.

There is, among scientific men, a disposition to congregate together at intervals to compare notes and discuss the results of the researches in which they have respectively been engaged. It is therefore generally the case in localities where science is much cultivated, that societies or institutions exist for the promotion of the several branches of knowledge, and for the mutual improvement of the members. In London, such institutions abound, and almost every division and sub-division of science has its special Society: we may enumerate the Royal Society, the Royal Institution, the London Institution, the Linnæan Society, the Medico-Chirurgical, Pathological, Medical, Astronomical, Chemical, Pharmaceutical, Horticultural, Botanical, Microscopical, Statistical, Cavendish, Sydenham, Ethnological, Geographical, Epidemological. All these institutions are in a state of activity. Their meetings are held at regular intervals during the season. On almost every evening in the week some two or three scientific meetings clash with each other. Many of these Societies publish transactions, and are thus the medium through which the results of the labours of their Members become known to the public.

On recently inquiring "What corresponding institutions are flourishing at Birmingham?" we were not a little surprised at being informed that there had been three, namely, the Philosophical Institution, the Mechanics' Institute, and the Polytechnic, all of which had recently become the victims of atrophy or marasmus, and that with the exception of the Medical Schools and the Pharmaceutical Institution, which latter has for some time been in a dormant state, and is now about to be renovated, there is at this time no institution at Birmingham for the advancement of science.

The house of the late Philosophical Institution is provided with a very good theatre, a library, an interesting museum of geology, a chemical laboratory capable of accommodating a practical class of twelve or fifteen students, with other apartments adapted to the purposes of such an institution. The decease of the late curator, Dr. Ick, appears to have paralyzed it, some internal causes (which it is needless to enter into) hastened its decay, and it is dissolved. The building might still be obtained at a rent for scientific purposes; but unless some steps be taken without delay for restoring its former activity, it will, in all probability, be converted into a manufactory for needles and pins, steel pens, or buttons. The revival of the Pharmaceutical Institution, and the endeavour to amalgamate it with the Pharmaceutical Society, may probably operate as an exciting cause for the reconsideration of the subject and the adoption of energetic measures for effecting this desirable result.

We are not unmindful of the fact that science may be advanced by individual exertions. At the same time, experience has shown that this advancement is greatly promoted by societies where scientific men meet, where science is taught, and information respecting discoveries and improvements disseminated. Considering the reputation of Birmingham for skill and ingenuity in the practical application of the scientific arts, it appears extraordinary that the usual means of encouraging and extending researches of this nature should be so much neglected, from which it might almost be inferred that the manufacturers depend upon extraneous sources for the scientific principles which are the foundation of their commercial prosperity.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

Wednesday, October 13, 1852.

MR. GIFFORD, PRESIDENT, IN THE CHAIR.

This Meeting, which was the first of the Session, was numerously attended by Members and Associates of the Society, as well as by students. The number of visitors was not so large as on some former occasions. The subjects which had been announced occupied the attention of the Meeting until a late hour, and other contributions subsequently received, were deferred until the next meeting.

The President congratulated the Members on the commencement of the session with so large a meeting. Although the state of his health would not admit of his taking an active part in these proceedings, he had made an effort to be present on that occasion, and should always feel gratified in attending in his place at the meetings, and promoting so far as he was able, the objects for which the Society had been established.

DONATIONS TO THE LIBRARY AND MUSEUM.

Shannon *On Brewing and Distillation*; Falconer *On Bath Waters*; Macgregor's *Medical Sketches*; Wall's *Dissertations on Select Subjects in Chemistry and Medicine*, from Mr. Ince.

Thomson's *Chemistry*, 4 vols., from Mr. Till, 4, Thayer Street, Manchester Square.

Quarterly Journal of the Chemical Society, from the Chemical Society.

Quarterly Journal of the Microscopical Science, from the Publishers.

The Assurance Magazine and Journal of the Institute of Actuaries, from the Institute of Actuaries.

The Literary Gazette from April last, from the Publishers.

Crystals of Alum and Chrome Alum, from Mr. William Copney.

DISTRIBUTION OF PRIZES IN THE SCHOOL OF PHARMACY.

The prizes awarded to the successful competitors at the examinations in the classes of Materia Medica, Chemistry and Pharmacy, and Botany, at the conclusion of the last session, were distributed to the following Students:—

MATERIA MEDICA.

Lecture Pupils:
- Prize ..... Mr. Witt.
- Certificate of Merit ..... Mr. Daines.

Laboratory Pupils:
- Prize ..... Mr. Parkinson.
- Certificate of Merit ..... Mr. James Bell.

CHEMISTRY AND PHARMACY.

Lecture Pupils:
- First Prize ..... Mr. Witt.
- Second Prize ..... Mr. Northcote.
- Certificate of Merit ..... Mr. Daines.

Laboratory Pupils:
- First Prize ..... Mr. Parkinson.
- Second Prize ..... Mr. Gregory.
- Certificate of Merit ..... Mr. Picciotto.

BOTANY.

FIRST PRIZE.....Mr. Daines.
SECOND PRIZE.....Mr. Parkinson.
CERTIFICATES OF MERIT... {Mr. Gregory. / Mr. John Doyle.

The following were the Questions for Examination in the several classes:—

CLASS OF MATERIA MEDICA.

EXAMINER, DR. PEREIRA.

1. Explain the meaning of the terms *periderm* and *derm*, as used by Dr. Weddell in describing Cinchona barks.
2. What are the characters by which quinine, quinidine or β quinine, and cinchonine are respectively distinguished?
3. How is the purity of sulphate of quinine to be ascertained? and by what means could you detect the presence of the disulphates of quinidine and cinchonine, of sulphate of lime, of salicine, and of mannite?
4. By what optical characters are raw cotton and gun-cotton respectively distinguished? and what optical change is gun-cotton liable to by keeping?
5. Give the diagnostic botanical characters and the leading chemical properties of the following natural orders:—*Coniferæ*, *Labiatæ*, *Compositæ*, and *Cruciferæ*; and enumerate the officinal substances obtained from each of these families.
6. What are the microscopical and chemical characters by which the presence of roasted chicory and roasted corn are detected in roasted coffee?
7. Describe the microscopical characters of the Honduras and Jamaica sarsaparillas.
8. Give a sketch of the Pharmaceutical history of balsam of copaiba.
9. Name the substances marked 1, 2, 3, 4, 5, and 6, and point out the characters by which you are enabled to distinguish them.

[*Candidates may avail themselves of the use of a Microscope in answering the last Question.*]

CLASS OF CHEMISTRY AND PHARMACY.

EXAMINER, MR. REDWOOD.

1. The weight of a substance being the measure of its gravitating force, in what way is the accuracy of the indication, obtained by the balance, affected by the air in which the substance is weighed? If 100 grains of platinum and 100 grains of wax be weighed in the usual manner with a brass weight, would the gravitating force of the platinum, the wax, and the brass weight, be equal, or if not, how and why would it differ?
2. How are the standards of the weights and measures, established by law in this country, determined?
3. Explain the principle of the action of hydrometers in the determination of the specific gravities of liquids.
4. What are the best methods of making spermaceti, castor oil, and balsam of copaiba into emulsions?
5. What are the best excipients to use for giving the pilular consistency to each of the following substances:—Rhubarb, aloes, calomel, common turpentine, oil of peppermint, mercurial ointment?
6. Bottles made of blue glass are sometimes used for preserving substances which are liable to be affected by the light: in what way would the colour of the glass influence the result?
7. Describe the sources from which the iodine of commerce is derived; the process by which it is obtained; its compounds with oxygen, hydrogen, and potassium, and the best methods of preparing these.
8. Describe the processes by which carbonate of soda and sesquicarbonate of ammonia are manufactured.
9. What are the compositions respectively of formic, acetic, butyric, and valerianic acids?—how are these acids obtained?—and what relation do their boiling points bear to their compositions?

CLASS OF BOTANY.

EXAMINER MR. BENTLEY.

1. Enumerate and describe the structure of the different forms of cells, and the tissues which they respectively produce by their combination; also mention the parts of plants where they are to be found.
2. Describe the structure of a leaf-bud, a bulb, a rhizome, a tuber, and a cormus.
3. What are the distinctive characters between a root and a stem?—and state the differences which exist between the roots of Acotyledonous, Monocotyledonous, and Dicotyledonous plants.
4. Describe the process of respiration in plants; and compare the changes which it produces upon the atmosphere with those of animal respiration.
5. What is the meaning of the terms indefinite and definite inflorescence? Mention the different kinds of indefinite inflorescence, and describe and give examples of the following kinds:—spike, raceme, corymb, panicle, umbel, and capitulum.
6. Describe the structure of the anther and pollen; and explain the manner in which the process of fertilization takes place.
7. Give the essential characters of the following Natural Orders: Papaveraceæ, Malvaceæ, Rosaceæ, Umbelliferæ, Compositæ, and Oleaceæ.
8. Distinguish the Natural Order Amaryllidaceæ from the Iridaceæ, Liliaceæ, and Melanthaceæ.
9. Mention the distinctive characters of the classes and sub-classes in the Natural System of De Candolle.
10. To what Natural Order would a plant presenting the following characters belong: sepals and petals 4 or 5 each. Stamens indefinite in number, perigynous. Carpels united into a many-celled inferior pistil, with a simple style and stigma. Leaves dotted.

The PRESIDENT then called upon Mr. Jacob Bell to proceed with the observations of which he had given notice, on the mode of conducting the Pharmaceutical Meetings.

Mr. BELL said that, having taken an active part in the establishment of these meetings, and having had a specific object in view in the course which he had taken in reference to them, he was desirous of making a few remarks at the commencement of a new session, for the purpose of directing attention to the influence of scientific discussions on the character and progress of the Society, and the mode in which such discussions might be made most attractive and useful. The plan upon which the Society had been founded comprised various means of promoting the same end, namely, the advancement of the science of Pharmacy and the elevation of the character and position of the Pharmaceutists of this country. The Pharmaceutical meetings were instituted for the purpose of awakening the interest of the present Members in the progress of science, and affording them an opportunity of mutual improvement. The institution of such meetings was a novelty in this country. The Members of the Society were not accustomed to scientific discussions, and were greatly indebted to some of their scientific and professional friends, who, approving of the undertaking, came forward liberally, furnished papers, and attended the meetings. Without this co-operation the character of the meetings could scarcely have been maintained, and the Members of the Society, feeling sensible of the disadvantages under which they had laboured in regard to scientific education, were confirmed in the belief that a School of Pharmacy was a necessary part of the plan upon which the Society was based. Thus, while the Pharmaceutical meetings, supported as they were by the countenance of professional men, served to stimulate and encourage the Members in the pursuit of knowledge, the School was furnishing elementary instruction, and qualifying the present Associates to conduct in a more efficient manner the future Pharmaceutical meetings. He (Mr. Bell) had watched attentively the progress of the meetings; he had observed the fluctuations in the attendance and in the spirit with which they had been supported; he had heard various causes assigned for their occasional depression; he was prepared to prove that some of

these notions were erroneous, and to point out the means by which a more uniform success might be ensured. The early meetings having been held before the Society had the requisite accommodation, were not official in their character, but had been transferred to the house of the Society as soon as the rooms were ready, and he as well as those who had individually assisted him in the management, had gradually resigned this responsibility into the hands of the Council and officers of the Society, and endeavoured to identify the proceedings more completely with the Members at large. Nevertheless, it was a source of complaint that the meetings were too much under the direction of a few individuals, that they were not sufficiently official, and that the Members would not contribute to the support of proceedings in which one of their number occupied too prominent a place to the exclusion of others. At the commencement of the session before last it was intimated to him that a different arrangement would be more satisfactory, that the meetings should be superintended by a Committee officially appointed by the Council, and that all papers should be communicated through Mr. Redwood, as the scientific officer of the Society. This was the most favourable symptom which had manifested itself. It denoted a general disposition to come forward in support of the scientific character of the Society, and he considered it the greatest triumph which could have occurred, because it proved that the meetings had been the means of drawing out the Members and enlisting them in the work. In compliance with the intimation referred to, he had retired to the back benches and watched with much satisfaction the zeal and spirit with which the meetings were conducted. During that session, Mr. Ince, the President, took the lead, the Committee were active, the Secretary indefatigable, papers abundant, and the meetings well attended. The session terminated as it had commenced, leaving an impression that the scientific meetings were completely established, the Members of the Society inoculated with zeal in the cause, and that the ensuing session would be equally satisfactory. During the recess, however, some Members of the Society complained that Mr. Redwood had taken too prominent a part in the meetings—that the management was not sufficiently official; and it was resolved that the Committee should in future have the direct and entire control. On the opening of the next session (in 1851) the day for the first meeting arrived. The Committee had done nothing, no preparations were made, no papers were in hand, and no meeting announced. The Council inquired of him (Mr. Bell) the cause of this oversight, and he referred to the Committee who had released first himself, and then Mr. Redwood, from the responsibility, and who had omitted to make the needful arrangements. At the request of the Council, he and Mr. Redwood assisted the Committee in preparing for the subsequent meetings, but the spirit of the Members appeared to have flagged, and the session was not nearly so satisfactory as the previous one. It had been alleged that the Pharmaceutical Journal had absorbed the papers which ought to have been supplied to the meetings, and to this circumstance was attributed the dearth of materials for discussion. He had, however, disproved this allegation, and shown that the reverse was the fact, as he had invariably handed over to the Committee any papers sent to him for publication which were suitable for the meetings, whenever the authors would give their consent, which was not always the case, and one of the parties who had refused, was now one of the chief promulgators of the allegation before mentioned. Another circumstance which had tended to depress the meetings, was the falling off in the attendance of medical men and other scientific visitors, and this was attributable in part to a regulation which had been adopted by the Council with regard to the admission of visitors. He was ashamed to state the cause of this regulation, but being in force, and being in his opinion pernicious in its tendency, he could not omit to mention it. It had been alleged that some Members of the Society had sent cards of invitation to medical men with their own business cards, for the purpose, as it was suspected, of advancing their own private interest; and it was therefore resolved, that any Member desiring to introduce a visitor, should furnish his name and address to

the Secretary, who should send the card in the name of the Council. The existence of such a suspicion, and the regulation founded on it, he considered to be a disgrace to a scientific Society, and he sincerely hoped that the regulation would be rescinded. He should be glad to see every Member who attended these meetings introduce a professional friend. Nothing had conduced more to retard the progress of the Society than jealousy among its Members. Before the Society had been founded, jealousy had been a bar to union and to every kind of improvement. Great exertions had been made to combat this evil, and with considerable success; but more remained to be done; and if the Chemists ever intended to hold up their heads as a scientific and enlightened body, they must dispel from their minds those feelings of distrust and suspicion of each other, which were degrading even to an ordinary tradesman. The position of the Chemists had been changed. They were now recognized by Act of Parliament, and they ought to cultivate a more worthy and liberal spirit, and to take a broad professional view of the responsibility of their calling, and their duty to the public. Each Member of the Society, instead of carping at the exertions of others, seeking for causes of complaint, and suspecting of some sinister motives, those who took an active part in the affairs of the Society, should come forward and assist, waving minor differences, and keeping steadily in view the objects for which the Society was founded, and the advantages of union, education, and the advancement of science. If any Member objected that any other Members, by their exertions on behalf of the Society, had become too prominent, he should do likewise, and he would share the distinction. Each Member should feel himself identified with all the proceedings of the Society, and take advantage of any opportunity which might occur to promote its progress and prosperity. In the ordinary course of business, subjects continually presented themselves relating to new medicinal agents, new or improved preparations, &c., which might be introduced with advantage at the Pharmaceutical meetings, and it could not be supposed for a moment that there was any difficulty in providing ample materials for six or eight meetings in the course of the year. Ten years ago there might have been some grounds for an excuse; the Members were unaccustomed to proceedings of that kind; they were not prepared to carry them out efficiently, and depended on the contributions of professional friends. But it had been proved in the session before last that they were now competent to support scientific meetings with credit and advantage. Some of the early Students of the Society, now established in business, had enjoyed the advantage of an improved scientific education, and several of them had already entered the lists as contributors. The meetings had partially relapsed last year because the zeal of the Members had flagged; the regulation to which he had referred had tended to diminish the number of visitors; the attendance of Members had fallen off; and each appeared to be wondering what was to be done, and why more was not done, instead of doing something himself. The whole labour and responsibility had fallen on to two or three individuals, who were taken to task by those who had done nothing, and who attributed to selfish motives those individual exertions by which the meetings had been kept up at all. These words might sound harsh and grating to the ears, but the facts could not be disputed. It was better to speak out boldly and probe the under-currents to their source. Once for all, it should be understood that candour and good-fellowship among the Members was the mainstay of the Society. If any were dissatisfied let them speak without reserve, and let all differences and distrust be banished. The commencement of a session was a proper time for arriving at a mutual understanding as to the course to be pursued, and if all would unite harmoniously in the proceedings, a renewal of strength would be the result. Authors would not write papers for empty benches, and neither Members nor visitors would continue to attend meetings at which they found neither entertainment nor instruction. But if Members would attend, authors would write, and the

prospect of good papers would also attract Members and Visitors. These two requisites for a good meeting must proceed *pari passu*, and a good beginning would influence the whole session. Understanding that there were several papers on hand, he would not trespass longer on the meeting, and hoped the remarks he had made would be received as they were intended. It was his earnest desire to see the meetings conducted officially by the Council, and it was his object to encourage the Members generally to come forward, and by their presence and contributions to sustain the character of the Society, which, being now sanctioned by Act of Parliament, would be expected by the profession and the public to take the lead in the advancement of Pharmaceutical chemistry.

ON DISEASED WHEAT. (*Vibrio tritici.*)

Mr. Henry Deane made a verbal communication on this subject, which was illustrated with the microscope. He had been induced, he said, to bring the subject under the notice of the meeting (although it had no very direct relation to Pharmacy) on account of its general interest, affecting, as it does, the purity and wholesomeness of an important article of diet, and because it seemed calculated to afford an excellent illustration of the value of the microscope as an instrument of research. It was not until this instrument, with the wonderful powers which modern improvements have given to it, was applied to the investigation of the diseases of wheat, that they were at all well understood, and much still remained to be done in this direction by the Chemist as well as the Naturalist. The Pharmaceutist, if he took his right position, should be a botanist and naturalist as well as a Chemist, and he would, if properly qualified, be appealed to in cases such as that under notice for advice and assistance. This would especially be the case in agricultural districts, where facilities were afforded for the cultivation of those branches of knowledge—botany especially—which would give to the Pharmaceutical Chemist a scientific character, and gain for him a higher position in society.

His attention having been recently directed to the disease in wheat, commonly called ear-cockle, or purples, called also in Suffolk pepper-corn, and in Hampshire burnt wheat or burnt corn, he had been much interested in the investigation of the subject. This disease is caused by a minute animal, the *Vibrio tritici*, which when examined by the microscope presents some very remarkable phenomena. It appears to have been first described more than a hundred years ago by Turbervil Needham in a paper published in the Philosophical Transactions for 1744. The most complete and interesting description of it, however, is given by Mr. Bauer in the Philosophical Transactions for 1823. The *Vibrio tritici* is a minute worm, multitudes of which are found in cavities in the diseased grain, resembling, when viewed by the naked eye, a mass of white fibrous substance. If this be put into water it becomes diffused through the liquid, and, if it be now examined with a microscope, hundreds of extremely minute worms will be discovered, which become active after being immersed for about a quarter of an hour. No evidence of vitality is observed in these little animals so long as they are in the dry state, as found in the grain, but the presence of moisture soon brings them into activity, and in some instances they have been known to remain torpid for five or six years, and yet to be capable during this time of having their latent vitality made sensible at any period by immersing them for a few minutes in water.

The wheat in certain localities being frequently attacked with this disease, while in others it is entirely unknown, it has been thought that it probably originates in the soil; but no light has yet been thrown upon the conditions favourable to its development, or the means best suited for its prevention. These are questions deserving the attention of those whose opportunities for observation, and whose scientific knowledge may enable them to undertake such an investigation.

PROVINCIAL TRANSACTIONS.

PHARMACEUTICAL MEETING IN EDINBURGH.

A Pharmaceutical Meeting was held in the rooms, 72, Princes Street, Edinburgh, on Monday Evening, the 25th of October, at Eight o'clock,

J. F. Macfarlan, Esq., Vice-President of the Scottish Branch, in the Chair.

The following communications had been previously announced :—

1. An Address to the Members and Associates of the Society, by Dr. Christison, F.R.S.E., Professor of Materia Medica in the Edinburgh University, and Honorary Member of the Pharmaceutical Society of Great Britain.

2. A Paper on some of the more important Disinfectants, by Dr. G. Wilson, F.R.S.E., Lecturer on Chemistry, and Honorary Member of the Pharmaceutical Society of Great Britain.

3. Some Remarks upon the preparation of Syrupus Papaveris, by Messrs. T. and H. Smith, Chemists, Edinburgh.

John Mackay, *Sec.*

Edinburgh, 13*th Oct.*, 1852.

[The report of the meeting had not arrived at the time of publication.—Ed.]

LIVERPOOL CHEMISTS' ASSOCIATION.

Pharmaceutical Meeting, 24*th September*, 1852.

MR. SUMNER, PRESIDENT, IN THE CHAIR.

Mr. N. Mercer delivered a lecture on the "Chemistry of Gold." He observed that Liverpool, being one of the principal ports for emigration to the gold fields of Australia, information is frequently required there as to the best and simplest method of estimating the value of native gold, and of distinguishing it from all other substances which might, under any circumstances, be mistaken for it; therefore, in bringing this subject before the Chemists' Association, it was more particularly with reference to information valuable to Australian emigrants.

The lecturer commenced with a rapid sketch of the geological formation and distribution of mineral veins and deposits; and mentioned that though the presence of gold in Australia was only made known last year, it had been predicted three years previously by Sir R. Murchison, whose extensive knowledge of the gold fields of the Uralian mountains enabled him with the greatest confidence to speculate upon its presence among the mountain chains of Australia. This prediction was based on the great similarity which existed between the mountains and rocks in the two countries; gold, according to our present knowledge, always being found in unstratified, primary, or metamorphic rocks, or in alluvial deposits from the same. The conditions under which gold was usually found, and the means by which it was separated from its original matrix, or other substances with which it might be contaminated, were explained, and illustrated by models of the cradles employed at the "diggings."

Gold is always found in the metallic state, and never as a sulphide, as iron and copper are frequently met with, but generally alloyed with some other metal, such as silver, iron, copper, and platina. Amongst all its characteristics, the one which has the greatest recommendation for simplicity and ease of application, is the determinining its specific gravity, which, when pure, is 19.3—a specific gravity much higher than any other substance likely to be mistaken for it. The method of taking specific gravities was illustrated by experiment on a nugget in which the gold was interspersed with quartz, and which had a specific gravity of 13.5. Gold is not dissolved by any acid with the exception of aqua regia, and in this its solution is entirely owing to the liberation of chlorine, which, acting upon the gold, forms terchloride, $Au\,Cl_3$. $NO_5+3\,HCl+Au=Au\,Cl_3+3\,HO+NO_5$. That chlorine was the solvent was shown by treating bleaching powder with hydrochloric acid, when gold leaf was immediately dissolved; also in a mixture of common salt, saltpetre, and sulphuric acid; and again, merely by the addition of water to "Collins's Disinfecting Powder," when sufficient chlorine was evolved to dissolve the gold. When in solution the reactions of gold are so decisive and characteristic as to detect it in the presence of all other metals; and its behaviour with different reagents, as also that of silver, platina, iron, and copper, was illustrated by experiments. The most important reactions of a gold solution are those with

protochloride of tin, protosulphate of iron, and oxalic acid. Protochloride of tin throws down from a strong solution a brown pulverulent gold-tin, and from dilute ones the purple of Cassius, exhibiting, when very dilute, a most brilliant purple colour.

Protosulphate of iron precipitates metallic gold as a brown powder, which gives to the liquid a brown appearance by reflected light; but by transmitted light it appears blue. This test is so delicate that a solution of $Au\,Cl_3$ even more dilute than one part of gold in 40,000 parts of liquid, gives this reaction. Oxalic acid, and several other organic acids, precipitate metallic gold; and, according to Mr. R. Phillips, tartrate of soda will produce the same effect, so that, if oxalic acid is not at hand, a seidlitz powder may be used.

Copper pyrites, $Cu\,S$, iron pyrites, $Fe\,S_2$ and yellow mica, are the substances most commonly mistaken for gold, and to the eye of the inexperienced there is a great resemblance, but a few simple experiments at once dispel the illusion.

In the first place try the specific gravity, and it will be found that the heaviest of them, copper pyrites, does not exceed 5.0. A penknife will also detect the difference, for both copper and iron pyrites are brittle, while gold will cut like lead. This is an important distinction to bear in mind, as it is easily and readily applied to any suspected specimen. And as they are both sulphides, if a little is crushed and held on a bright shilling over a spirit-lamp, the silver will be immediately tarnished. When dissolved in acids they both exhibit their usual well-known reactions. Mica may at once be detected by its specific gravity, which is only three, and by its inertness with any of the reagents mentioned. Though the detection of these substances is most simple, and many will think it almost impossible to mistake any of them for gold, yet experience proves such is not the case, many persons having had to pay dearly for learning that "all is not gold that glitters."

Mr. Mercer concluded with a rapid sketch of the metallurgy of gold, merely to give an idea of the nature of the processes employed, explaining that they all required the greatest care and attention, and were only to be prosecuted with any chance of success by persons who had had considerable practical experience.

Dr. Edwards was informed that cinnabar had lately been brought from Australia. He showed some binoxalate of potash which he found to contain nitric acid, apparently from carelessness in the manufacture. The effect was, that when mixed with cream of tartar for removing iron moulds it became in a short time useless. He showed one of the new magnets made at Haarlem, which had excited much attention on account of their great power. This, which weighed about a pound, would sustain a weight of twelve pounds. He also showed one of the stereoscopes of Professor Wheatstone.

The Secretary called attention to the classes about to be formed for the study of Chemistry.

[Mr. C. H. Shaw, of No. 2, Russell Street, Liverpool, having accepted the office of local Secretary for that town and neighbourhood, requests the Members and Associates of the Pharmaceutical Society resident in that locality to apply to him for the current Journals on the fourth or fifth of each month.]

MEETING OF CHEMISTS AND DRUGGISTS AT BIRMINGHAM*.

On Tuesday, the 12th October, a Meeting of the Chemists and Druggists of the counties of Warwick, Worcester, Stafford, and Salop, was held in the Theatre of the Philosophical Institution, Cannon Street, Birmingham, for the purpose of considering the details of the Pharmacy Act, passed during the last session of Parliament, and to resolve upon some plan in which they could unite for bringing it into full operation, and extending its benefits to all those who are entitled to share them. The Meeting was well attended by the Chemists of Birmingham and the surrounding districts, and a considerable number of Assistants.

The Chair was occupied by Mr. Wm. Southall, jun., President of the Birmingham Pharmaceutical Institution. Having opened the business of the Meeting, the Chairman read letters of apology from the following gentlemen, expressing regret that engagements of a pressing nature prevented their being present:—Mr. Hollier (Dudley), Mr. Perrins (Worcester), Mr. Baly (Warwick), Mr. Charles Loggin (Stratford-on-Avon), Mr. Wilkes (Upton-on-Severn), Mr. Fleeming (Wolverhampton), Mr. Wingrave (Coventry), Mr. Huxley (Bromsgrove), Mr. John Parker (Newtown Row, Birmingham), and Mr. Roberts (Islington, Birmingham).

* A more detailed Report of the Meeting may be had of Mr. Churchill, Princes Street, Leicester Square.

The Chairman then said: The business of the Meeting has now been laid before you, and our friend Jacob Bell, who has kindly attended, will give us some information about the Pharmacy Act. It is a very important era in the history of our Society, as well as a subject of much interest to Chemists and Druggists generally. I hope that this Meeting will prove an interesting one, and that important results will come from it. I now call upon Jacob Bell to address the meeting.

Mr. Bell said: There might, possibly, be not only some difference of opinion respecting the value of the Pharmacy Act, but indeed also with respect to the value of any legislative enactment at all on the subject. Some persons carry their notions of free trade so far as to say every one should be left to take his own course, and that the law should take no notice of the qualifications of any individual for carrying on any particular profession, or the way in which he conducts his business. And, so far as trade in general is concerned, this may be right. But it must be remembered, that the business of a Pharmaceutical Chemist is one in which life and death are involved, and in which some controlling interference is not only justifiable, but necessary, in order to protect the public against those fatal results of mistake or accident which are likely to occur when persons engaged in the dispensing of medicines are unacquainted with their business. The object of this Act might be stated to be "To convert the entire body of Pharmaceutical Chemists, or Chemists and Druggists as they are now called, into a legally qualified professional body." It might not at first sight appear obvious in what manner any Act of Parliament could do this. No Act could on a sudden make any class of men educated; and as, before the Pharmacy Act passed, a great many of the trade were not educated as the future Pharmaceutical Chemists will be, it must be understood that the manner in which this Act is intended to operate is gradual and prospective. The rising generation would derive the chief benefit, but the present generation would participate in the advantages, by enjoying a greater amount of public respect and confidence than they would be entitled to enjoy if they were inactive when a work of this great importance was before them.

Mr. Bell proceeded to explain the manner in which a qualification is usually made compulsory by Act of Parliament—in the medical profession for example—and contrasted this with the voluntary principle of the Pharmacy Act, pointing out the necessity for education in Pharmacy, and the great advancement of all the arts and sciences, Chemistry in particular. He defined the duties the Chemist has to perform, and pointed out the advantage of the division of labour, and the cessation of rivalry between medical men and Chemists. With regard to the *modus operandi* of the Pharmacy Act, he observed: It must be quite obvious that it is desirable to improve our qualifications and establish ourselves as an educated Pharmaceutical body. You may ask, "How is this to be done by this Act of Parliament?" and I think it will not be very difficult to answer so natural an inquiry. In the first place, we must remember that there is no compulsion in the Act—all is entirely voluntary. Any person who wishes to remain plain "Chemist and Druggist" may do so, inasmuch as any person who wished to remain a "barber" at the time the separation took place between the barbers and the surgeons, might have done so still, and he might have bled and performed operations in Surgery. But those who were surgeons proper, and possessed of the necessary qualification, became in time a perfectly separate class, and felt that it was beneath their dignity to be classed with the barbers. So we, in like manner, are about to separate a class of men recognized by Act of Parliament under the title of "Pharmaceutical Chemists," from those whose capabilities would not admit of their passing the necessary examination, or who do not think it worth their while to endeavour to obtain the qualification. Of course everything must have a beginning. The Act declares that the Members of the Pharmaceutical Society (which was established about ten years ago for the express purpose of raising the character of the Chemists of this country, and protecting their general interests as one united body) shall henceforth be entitled to use the name of "Pharmaceutical Chemists," "Pharmaceutists," or any other name implying that they are connected with this Society; and any person not belonging to this Society, if he assume any of these titles, is liable to a penalty, or if he exhibit any certificate purporting to be a certificate of membership, he is liable to punishment for "misdemeanor." It is quite clear that the value of this Act depends upon the Chemists themselves. They have now the power of making themselves as respectable, as educated, and as prosperous a body as they may think fit. If they discard the Act, and will have nothing to do with it; if they refuse to put their hands into their

pockets to defray the expenses of the machinery requisite for carrying the Act into operation, but prefer to go on as they have done, they may continue to be merely "Chemists and Druggists." Supposing a large proportion of the trade take this view of the case, the public might for a time suppose that a Chemist and Druggist was about as good as a Pharmaceutical Chemist. By degrees, however, the term "Pharmaceutical Chemist" would become applicable to a very small class of men, who, having carried out the intentions of the Act, would enjoy a monopoly of qualification, and the character thus acquired would ultimately attract the public, and place them in possession of a monopoly of the business. I do not in the smallest degree anticipate that the Pharmaceutical Society will cease to exist. I believe it is now so firmly established, that whether it be adopted by the trade at large, or remain in the hands of a small number, it will still go on; I believe there will always be a number of individuals who will see it to be their interest to avail themselves of the credit and position conferred by the Act on qualified men, and it must be admitted, that in inviting others to come forward and partake of the advantages thus offered, the Members of the Society are acting on liberal principles. It is quite clear that the *prestige* of an Act of Parliament must sooner or later give some weight of character to those who come under it. We have the option of keeping this *prestige* to ourselves as a monopoly, or we may extend it to our brethren; of these alternatives we choose the latter. We have not been endeavouring to establish a small association for our own benefit; but have been acting upon public motives, for the advancement of the Chemists and Druggists of the United Kingdom. We have continually repudiated the idea that we are a clique; we shall continue to do so; we have always exerted ourselves as the representatives of the entire drug trade.

Mr. Bell next explained the regulations with regard to the admission of Members, the manner in which the examinations were regulated, the nature and object of the exemptions, the proposed new bye-law, the proposition which had been made, but not yet decided upon, to adopt three classes of certificates at the examinations, and the grounds upon which the assistants of the present time might fairly expect some degree of leniency. He concluded as follows:

The Council having announced their desire to adopt a liberal interpretation of the law with regard to admission, it is not too much to expect that the Chemists in different localities will come forward and strengthen their hands by recommending new Members, by taking steps for promoting education, and adopting other means for carrying out the objects of the Pharmacy Act. I should be glad to see the Society completely organized, and a local secretary in every town in direct communication with our secretary in London. Wherever there are Members in sufficient number, there should be a local branch of the Society, which should meet and discuss scientific subjects and questions relating to the welfare of the Members and the character of the body to which they belong. By this kind of organization we should do much to raise our qualifications, and furnish the young men resident in the rural districts with the rudiments of an education which they would afterwards complete in some of the larger towns or in the metropolis. We should also obtain an amount of strength and influence, the value of which it is impossible to estimate. For you must be aware that when our interests have been attacked in the House of Commons, a judicious organization of our Members has proved to be an important lever, which has on several occasions protected us against great injustice and permanent injury. We know not what emergencies may arise in future, but we must be prepared to meet them as they occur. Determined to uphold our character, and do our duty to the public, we ought in justice to ourselves to maintain our rights, in case of any attempt being made to interfere with them. This is a view which interests some Members, and it is proper, in considering the Pharmacy Act and the principles of the Society, to mention all the different views that may be taken, so that we may enlist the interest of all classes of our Members. I have said nothing about the Benevolent Fund, but every one knows that it is well to be prepared, so that, in the case of any unforeseen misfortune, we may be able to give such relief as a benevolent fund may be capable of affording. We have on several occasions given donations to Members, and the widows and families of Members, by means of which great suffering has been prevented, and temporary difficulties overcome. This is a branch of the subject which we do not bring forward very prominently. It is simply a collateral means of promoting union. Our grand object consists in raising the professional qualifications of our body, and carrying out the principle that "England expects every man to do his duty."

Mr. Morris Banks said that since he had been under that roof the following resolution had been put into his hands, and he felt quite sure it would be very heartily responded to by every gentleman present:—"This Meeting being convinced that the Pharmacy Act, when fully carried out, will be of great advantage to Chemists and Druggists and to the public; and seeing the desirableness of including all those who are qualified for their business in the register of Pharmaceutical Chemists, resolves that Messrs. Hughes, Fleming, Hollier, Righton, Leay, Banks, Snape, and the local Secretaries, be appointed a Committee, with power to add to their number, to watch over the interests of the Chemists and Druggists of this district, to ascertain and certify to the qualification of those who desire to be admitted into the Pharmaceutical Society, and to co-operate with the Council in any other matters requiring the aid of a local board." I must remark (continued Mr. Banks) that I think the subject of the forepart of my resolution has been entirely exhausted by the masterly address to which we have had the privilege of listening, for seldom have the Chemists and Druggists had the opportunity of hearing such powerful argument in terms so eloquent. The conclusions, to my mind, are self-evident, and I think every gentleman must admit the time has come when we must be united if we wish to preserve our position. We must have "a long pull, a strong pull, and a pull altogether." The former part of the resolution goes simply to recognize the desirableness of registering all qualified persons. I do trust, from the arguments you have heard, that no gentleman will be deterred from entering his name as a Member of the Pharmaceutical Society. The public will unquestionably be soon able to distinguish those who are qualified from those who are not; and therefore, taking the low ground of interest alone, it is incumbent upon every one forthwith to become a Member of the Society. The latter part of the resolution pledges a committee of gentlemen to watch over the interests of the trade of this district. I can only say I will be very happy to do all in my power, and to exercise my humble talents in endeavouring to do so, as I confess I never felt so warm in the cause before. I have therefore much pleasure in moving the adoption of the resolution.

Mr. Blunt (of Shrewsbury) said: I beg very cordially to second it, and also to take the opportunity of thanking Mr. Bell, and asking him to convey our thanks to the Society for their liberality in offering to admit those who have been in business prior to the obtaining of the Charter. I have been in business for thirty years, and shall always feel a pride in being one of the Members.

Mr. Gummery (of Kidderminster): There are qualifications spoken of as being necessary before those in business previous to the passing of the Charter can be admitted. What are they?

Mr. Bell: The candidates must produce certificates of qualification, signed by two Members of the Society, forms of which may be obtained from the Secretary. The proposed bye-law I have spoken of has reference to those who commenced business after the date of the Charter, but before the passing of the Act. As soon as it is approved by the Secretary of State, the form of certificate will be issued, and it will have to be signed in each case by two Members, and countersigned by the local Secretary.

Mr. Southall: It appears to me to be very desirable that all present who were in business before the granting of the Charter, and are desirous of joining the Society, should do so now, in order that we may at once know what strength we have.

Mr. Bell: I think that would be very desirable.

Mr. Horncastle: I wish to ask Mr. Bell whether Chemists and Druggists in business on their own account, and who do not register, will be able to assume the title of Pharmaceutical Chemists? It is the opinion of many that they will be able to assume this title, and use the same emblems as those belonging to the Society.

Mr. Bell: They certainly will not be able to assume or use the title "Pharmaceutical Chemist," or "Pharmaceutist," or any other title which the Society will formally assume; but they may assume the ordinary emblems used by the Druggists at present. The subject has been much discussed by the Council, and in process of time some emblem will be adopted for the purpose of distinguishing those who are Members from other persons. But it was thought desirable not to be in a hurry on this point, as emblems, if hastily adopted, might be considered as something like an approach to quackery. It was thought desirable to allow the Society to gain its character upon its own merits, instead of letting the emblems precede its character.

Mr. Bird: Then, in point of fact, if there be a Chemist and Druggist who may

have the title assumed by the Society painted over his door, and does not think proper to join the Society, he will be doing an illegal act, and subject himself to penalties if that sign remain?

Mr. Bell: Certainly he will be liable to the penalty under this Act. The Council are not desirous of beginning prosecutions in a hurry, but I am speaking of what is the law of the land. There are certain persons who, seeing that the Pharmaceutical Society was at work raising the character of the body at large, did not think fit to join the Society and pay the subscription, or assist in any way, but who nevertheless adopted the word "Pharmaceutical" on their shop fronts and labels, by which the public have been led to suppose they did belong to the Society. Now they find an Act has passed which restricts the use of the term, and they will be obliged either to cease using it or join the Society.

Mr. Beck (of Dudley): Will there be any difference between those who joined it before the Act passed, and those who may do so afterwards?

Mr. Bell: All Members enjoy the same privileges. It was originally the intention of the promoters of the Act to admit every individual already in business to the privilege of registration, but it was the opinion of the Committee of the House of Commons that it should be restricted to those recognized by the Society. They said, "You want an Act because many assume the name of Chemist, &c., who are not qualified, and yet you propose to give the *prestige* of the Society to those persons whom it is the primary object of the Act to exclude." They said that was not right; that future Members must pass through what I may call the filter of the Society, so that the name might not be assumed by every one who chose to put coloured bottles in his window, but only by those who could show some claim to it, either by production of satisfactory certificates or by passing the examination; and all, when once admitted, are in the enjoyment of the same privileges.

Mr. Bew (of Bilston): Although I may not be so old as some persons present, yet I entered upon my apprenticeship in 1816, and have been since then in business in an adjoining town, as many of you know. I was ever strongly opposed to the Pharmacy Bill, as proposed some years ago, and I have had something to do with the passing of the late Bill, though not so prominently in it as Mr. Bell, my sentiments reaching him through some members of the House of Commons, who I know have conversed with him on the subject. Its chief object, I presume, is that of benefiting the trade by raising the standard of character amongst Chemists. I was fearful we might make something of a monopoly, and being a free trader, and opposed to monopolies of all kinds, I opposed it; but having gone over the Act of Parliament, as amended, I think the time has now come when we may unite to raise the trade, and endeavour to make it what it ought to be, the next of the professions. As an old Chemist and Druggist who has not hitherto joined, I rise now to state that I shall be glad to become a Member of the Society. I trust I shall be able to find two gentlemen who will recommend me as duly qualified. My object in doing so must, I suppose, be the good of the rising generation, as I cannot hope to derive much benefit for myself; but I trust it will be the means of raising the character of those who may be connected with me as Apprentices and Assistants, by inducing them to look to the Society as a means of elevating their position in life. I trust that as a trade we may always be liberal. I like the suggestions thrown out with regard to Assistants who may not be able to get a first-class certificate, and I trust such may be able to get a second-class if not the first. My object in rising was merely to say that, viewing the Institution as somewhat settled and established, I shall be very happy to enter and continue a Member.

Mr. Southall: I am glad to hear those remarks, for one of the oldest Members in the trade has also told me that he did not like the former Bill, on account of its being too exclusive. I must say that I was disappointed in the present Bill at first, but the more I think of it, the more I feel that if properly carried out, it will be as efficient as we could wish, without injuring any of those great free trade principles which we all desire to support.

The resolution was then put to the Meeting, and passed unanimously.

Mr. Southall rose to move the second resolution:—"That in the opinion of this Meeting, some leniency, in regard to the examination, should be extended to those Assistants who have been some years engaged in the business, but who have not yet joined the Pharmaceutical Society;" and, in continuation, said, I most fully concur in the sentiment contained in this resolution, for all of us who are masters of any experience, must know that our young men do deserve consideration, from the circumstance that many of them, having been principally engaged in the mere routine of business, the making of pills, the preparation of ointments, and so on, have had little opportunity of getting such a knowledge as the state of the times requires. I do hope we may all unite in endeavouring to let our young men have that time for instructing themselves in scientific matters which they require, and also in furnishing them with books necessary for the purpose. No doubt there are many young men well qualified for the routine of shop business, who are not qualified for passing the examination required by the Pharmaceutical Society; and in regard to whom there must be a good deal of study and attendance at lectures before they can be qualified to pass with credit to themselves and the examiners. Now these, finding a door left open for them, will naturally do all they can to obtain at least the second-class certificate; but even on the principle that half a loaf is better than no bread, we may also expect that some of them will not disdain to accept the lowest certificate of all. All such efforts will advance the education of the trade, so as to enable us, at all events, not to fall behind in this wonderful age of progress. There are various parts of the country where the subject has been taken up very powerfully, and I hope Birmingham will not be behindhand in endeavouring to carry out so important and desirable an object. We must recollect that the present race of Assistants will very soon supply our place; and I do hope, therefore, we shall be able to show our young men some leniency, in giving them opportunity for filling our positions more worthily than we have done, and in encouraging them to prepare for passing the examinations of the Society.

Mr. Leay briefly seconded the adoption of the resolution; and Mr. Bell (in answer to a question put by Mr. Bird, in reference to the amount of classical knowledge required) said,—The classical examination was so very mild that any one who could not pass it, should be a grocer, a tailor, or in some business in which Latin was not required. The resolution was then agreed to *nem. con.*

Mr. Snape submitted the third resolution:—"This Meeting recommends the adoption by all those who are registered under the Pharmacy Act, of the title of Pharmaceutical Chemists."

The Chairman, in seconding it, said, I trust we shall be in no hurry, supposing we carry this resolution, to assume the title or make any very great show, but that it will be adopted gradually, as the public will soon learn the value of this designation of the Members of the Society.

Mr. Banks: Has the subject yet been discussed by the Council, and is it their intention to give a hint as to some specific time being appointed for putting "Pharmaceutical Chemist" over our doors? It appears to me it should be done simultaneously.

Mr. Bell: It has not been discussed officially by the Council; but I have observed a disposition to keep the subject for the present rather in the background. It must be understood that the distinction between the two classes is not so great now as it will be in the course of a few years. It is our own exertions that will make the distinction an important one. The distinction at first was no more than this, that the one contributed his time and money to the promotion of a good object, while the other cared nothing about it; and after ten years' exertions the former class are now recognized by Act of Parliament. There can be no reason why any Member who pleases should not assume the name, but it must not be understood that any one who does not do it immediately is lukewarm on the subject. I, therefore, quite approve of the resolution.

Mr. Banks: I feel very strongly that, to let people see this Act has passed, it would be better if it were done simultaneously. I should be very sorry to see it commenced unless by a general understanding.

Mr. Bird: Although I am as desirous as possible of steering quite clear of anything approaching to quackery, I do think, that as we are a Parliamentary body, we should not be ashamed of showing our flag. It seems to me that if we are to be united, the sooner the mode of distinction is known the better, and the sooner will it be appreciated. I hope the Council will see the necessity of taking it into consideration, so that when the Society is fairly started we may know to a day when we should assume the Parliamentary title conferred upon us.

Mr. Southall: I think none of us should take any step in this direction till we do it simultaneously.

The resolution was carried *nem. con.*

Mr. Bird moved the fourth resolution:—"Impressed with the importance of improving the education of Pharmaceutical Chemists, and of supplying greater

facilities for acquiring a knowledge of the various sciences which are useful in their pursuits, this meeting requests that the Committee will provide means of instruction for Birmingham and the neighbourhood for the Assistants and Apprentices." This resolution (he said) appears to me to be one of very great importance. We have heard a great deal about the improvement of the education of our young men, and we seem all agreed, that the sooner we set about it the better. The next question is, therefore, "How shall we proceed?" When we talk to our young men about the necessity of acquiring a knowledge of the science of Chemistry in addition to being good counter Druggists, we must show them some way in which they may acquire that knowledge, as we all know that the incessant nature of their duties, under ordinary circumstances, renders it quite impossible that they can be good Chemists. There are some of us who, in early life, made experimental Chemistry a recreation, and are, therefore, Chemists by accident, but it is not of this class I speak, I speak of those who, engaged from morning to night in the routine of the drug trade, have scarcely an hour which they can devote to improvement in the higher departments of their business. If our young men are to be clever Chemists and good Druggists, we must put in their way some means by which they may acquire the necessary knowledge. A few of us have been considering this matter over, and we have a small society in Birmingham, which we have been carrying on for the purpose of supplying our young men with that experimental knowledge which we are unable to give them at home. Now that the railways are opened in all directions, it has been suggested that we should reinforce our Society, and if we cannot make it a first-class school, yet Birmingham being a central point, we may do much good in exciting a desire for experimental research in the minds of the young men of the town and district. Last session the lectures were of a very useful and instructive character. It seems to me we ought to keep our eyes steadily fixed on that little society, and this resolution directs the Committee to encourage it for the purpose of giving Assistants and Apprentices the aid they need in the acquirement of scientific knowledge. I look on the matter as one of great importance, for if we talk to our Apprentices about education, and give them no means of becoming educated, it is something like telling a man to run, and tying his legs. * * * *

Mr. Adkins seconded the resolution.

Mr. Buck said, that on a former occasion he had been asked to join the Society, but did not do so, as he could not see what advantage those residing in the country would derive from it. Now, however, he should be very glad to become a Member.

Mr. Bell: Seeing that education is the most important of all our proceedings, I trust every one will exert himself to promote the object of this resolution. I have been told, however, that this room has been sold for some other purpose, and I was sorry to hear it, as if such a building as this were shared by several societies, I cannot conceive how there could be the slightest difficulty in maintaining it in such a place as Birmingham. I could not conceive how it was that such an Institution as the Philosophical should be in a state of destitution, unless it were that there were so many other scientific institutions in Birmingham, that this was one too many. But I am told that this is the only one! See what Manchester has done in providing a library for the working classes. Similar movements are in progress in London, and in other places, and why should Birmingham be at this moment selling up its last scientific institution because it has not the pluck or the stamina to keep it on its legs? Why should not the Chemists come forward and contribute something towards the expenses of it, and see whether Birmingham is not large enough, and rich enough, and spirited enough, to keep one scientific institution, for the sake of the character of the town, where learning may be cultivated, and where the public may be taught to keep pace with the education proceeding in other parts of the country? Why should Birmingham be behind? You have had a capital meeting to-day, and just imagine what excellent meetings you could have in the evening, with perhaps twenty or thirty medical men coming to join in your discussions. There would be something in that which would give a stimulus to science, and would give young men an interest in it, for every proceeding of that kind has a good effect. The Members and Associates would go home and think of what they have heard, and in order to carry out their thoughts, they would refer to books and make experiments. By this means education would be promoted, and the character of our Society very much improved. All branches of science are so intimately connected, that a compound institution might be maintained by uniting several societies, and arranging the meetings so as to accommodate each in its turn.

Mr. Horncastle: I am happy that Mr. Bell has forestalled me in recommending a combination of different societies for the maintenance of a building of this sort.

Those who know Birmingham know that all its scientific institutions have fallen to pieces, and the Philosophical having been dissolved, we have received notice to quit our room. Cannot we, in conjunction with other societies, contrive to support some institution worthy of such an important town? We, as Chemists and Druggists, seem especially the parties who ought to cultivate the science of Chemistry; for, as was pointed out by Mr. Bell in his first address, we ought to surpass the Medical men in our knowledge of chemistry. At present there is no school in Birmingham where anything like a good system of instruction in Chemistry is given. At Queen's College and Sydenham College the course is too short to be sufficient for those who would make it a principal study. A short time ago a laboratory was established by Professor Shaw, and he had about ten or twelve pupils, few of whom, however, were Chemists and Druggists. If we could subscribe together and establish a laboratory, so that the expenses of the building should be defrayed, I am sure that by appealing to the manufacturers of the town, and to the Associates of the Society for encouragement, we should be able to establish a class large enough to support a Professor.

Mr. Southall: I hope Mr. Bell will not go away with the idea that this building is to be closed, as I believe we have the offer of still being accommodated in it. We cannot do so by ourselves, but if two or three other societies can unite in keeping it open, I think it may possibly be done.

Mr. Bird mentioned that the death of the late Curator had contributed greatly to the downfal of the Philosophical Institution.

The Chairman: I hope the inspiriting remarks made upon the resolution will produce some real effect, and that in time the Committee will carry out what is recommended, so that the Birmingham branch of the Pharmaceutical Society will more than supply the place of the extinct Philosophical Institution.

Mr. Horncastle moved a resolution, directing that the resolutions now passed should be forwarded to the Secretary of the Pharmaceutical Society in London; which having been seconded by Mr. Harvey, was unanimously agreed to.

On the motion of Mr. Blunt, seconded by Mr. Pickering, a resolution was passed, thanking Mr. Bell for his attendance.

Mr. Bell, in responding to the compliment, said,—The best acknowledgment I could desire is the satisfaction of witnessing the success of the efforts now in progress for raising and establishing the professional character of the Pharmaceutists of this country; and it is especially gratifying to observe the symptoms of progress and co-operation manifested in the town of Birmingham, which much exceed even my most sanguine expectations. It is difficult to demonstrate clearly the individual benefit resulting from the collective exertions of a society of this description. However self-evident may be the proposition that education is of the highest importance, that knowledge is power, and that professional character is the best passport to public confidence and patronage, it is impossible to estimate in £ s. d. the precise return which each Member receives, or is likely to receive, for his subscription in support of such a society. But I have never attended a meeting in which, when the case was fairly stated, the opinion of all present was not unanimous as to the good effects which would result from the contemplated improvement in the qualifications of the Pharmaceutical Chemists of this kingdom; and I trust that, in the course of a few years, we shall be a very different body from what we now are. I have lately attended several meetings in county-towns on the subject, but this is the largest for the size of the town, and in many respects the most spirited one I have had the pleasure of attending. I only hope you will persevere, because that is the great difficulty. During the first introduction of a subject like this, a great deal of enthusiasm is often manifested, but in six months it sometimes begins to flag. I trust this will not be the case with you, but that Birmingham will be an example to all other large towns. When they hear of what you are doing, Liverpool and Manchester will strive not to be outdone; Bristol, Newcastle, and other places will be encouraged, and the influence may possibly extend even to York.

After a few remarks from Mr. Southall, as to the benefit the public would derive from the measures they might adopt, a vote of thanks was passed to the Chairman for the courtesy and ability with which he had presided, on the motion of Mr. Banks, seconded by Mr. Bird.

In acknowledging the vote, the Chairman said, the best congratulation he could receive, was to see so large a meeting assembled at an hour which was to many very inconvenient; and he trusted those present would not allow the matter again to go to sleep.—The proceedings then terminated.

NOTES UPON THE DRUGS OBSERVED AT ADEN, ARABIA.

BY JAMES VAUGHAN,

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Communicated by Daniel Hanbury.

Gum Arabic, *Gummi acacice*, known in Arabia and on the African coast by the name of *Sumgh* صمغ. The acacia which yields this gum is generally a small shrub of a dry and withered appearance; occasionally, however, it shoots out into a tree of from twenty to thirty feet high. The Somalis on the north-east coast of Africa collect the gum during the months of December and January. The process of obtaining it is extremely simple: long incisions are made in the stem and branches from which the juice flows, and when dry, is removed. After the gum of a district has been gathered, it is sewn up in goat-skins, and brought on camels to the great Berbera fair, or to some of the small settlements on the coast, and thence shipped for Aden and India. Three descriptions of the gum, styled severally, *Felick*, *Zeila*, and *Berbera*, are exported from the Somali coast.

1. *Felick Gum* is collected chiefly by the Magartain* Somalis and those who inhabit the district of Gardaf or Cape Gardafui. None of this quality, which is esteemed the best, finds its way to Aden; a little reaches Maculla and Shehr on the Arabian coast, but the mass is usually bought up by the Banians,† and shipped direct for India. The *Gum Felick* realises about twenty-five rupees‡ the hundredweight in the Bombay market.

2. *Zeila Gum*, so called from the port of that name, and

3. *Berbera Gum*, from the district of Berbera. The former of these is sold for fifteen, and the latter for thirteen rupees the hundredweight in the Bombay bazaar.

The acacia is common throughout Yaman and Hadramaut, but the Arabs do not appear to appreciate the shrub, as but very little gum is collected by them. The gum forms, however, an important ingredient in the preparation of their writing-ink, to which it gives that glossy appearance so much admired in old Arabian manuscripts. They also use it occasionally as a demulcent and nutrient, and give it in the form of mucilage to invalids, as we do arrowroot, sago, &c. The Somalis resident at Aden occasionally go a short distance into the interior and gather small quantities, which they immediately sell in the bazaar. The natives on the south-east coast of Arabia between Aden and Maculla also collect a little, but of this scarcely any is exported. During the past year (1851) 250 tons of Gum-Arabic passed through the Aden custom-house. The selling price here is from 2¾ to 3 rupees the *maund* of twenty-eight pounds.

Myrrh.—This gum-resin, sometimes called *Murr* مر by the Arabs, but more commonly in this district by the Indian name of *Heera Bôl*, is collected in great quantities by the Somalis in the north-east part of Africa and in the neighbourhood of Hurrur further south. It is generally brought to the large fair held at Berbera, during the months of November, December and January, and is there bought up for the most part by the Banians of India, and paid for principally in piece goods: barter, indeed, is the system upon which most commercial transactions are carried on in that district. Occasionally, the articles obtained are carried thither direct; but more frequently they are first brought over to Aden, and thence shipped for Bombay. Within the last few months, small quantities of the best description of myrrh have been collected in a district forty

* Otherwise *Meggertein*, or *Mijjerthein*.—D. H.

† Hindoo merchants.

‡ The rupee is equal to two shillings sterling.

miles to the east of Aden, and brought hither for sale.* This has been done by the Somalis; but there can be little doubt that as soon as the native Arabs become acquainted with this valuable product of their country, the trade therein will considerably increase.

Four hundred and fifty hundredweights of myrrh passed through the Aden custom-house last year, some of which was taken to America by American vessels, but the greater part was shipped for Bombay. The selling price here is 9½ rupees the *maund* of twenty-eight pounds.†

Bissa Bôl (Arabic), *Hebbakhade* of the Somalis.—This is the name of another gum-resin which is collected by the Somalis on the opposite coast and brought hither for sale or exportation. In appearance it resembles the myrrh already described; and the natives tell me that the tree from which it is obtained also resembles the Heera Bôl tree, but is nevertheless a distinct variety. I have not met with any description of this gum, and my impression is, that the tree which produces it, is yet unknown to Europeans. It is brought over with the myrrh and other gums by the Somalis, but does not appear to be very plentiful, as I find that only seventy *maunds* passed through the custom-house last year. Here it realises 2½ rupees *per maund*, and is sent from Aden to India and China, where it is mixed with the food given to milch cows and buffaloes, for the purpose of increasing the quantity and improving the quality of the milk. It is also used as a size, and when mixed with lime, is said to impart a bright gloss to walls which are covered with it. I am not aware to what other purposes it may be applied; possibly it may possess other useful properties, with which the natives are unacquainted. So far as my information extends, none of this particular gum has yet found its way to Europe.‡

Hotai هوتي is the name of a gum produced by a small thorny tree which grows in the Somali country about Bunder Murayeh. The tree or shrub is in appearance not unlike that which produces the myrrh, and attains the height of about six feet. The use of the gum, as far as I know at present, is confined to the Somalis themselves and more especially to the females, who consider it a good detersive for the hair, and almost the only one they know or ever use. When steeped in fresh water, it yields a slight lather.§

Olibanum, styled *Lubân* by the Arabs and by the Somalis on the opposite

* This information which I give from personal knowledge, may serve to correct a statement made by Dr. Malcolmson and reproduced in Royle's *Manual of Materia Medica*, that "there is no myrrh produced in Arabia." And I am further of opinion, notwithstanding the late researches of Dr. Carter, who fixes the limit of the Libanophorous regions of Ptolemy to 52° 47' east longitude, and expresses his belief that the myrrh-tree does not exist there, that farther investigation eastward from Aden will eventually substantiate the fact recorded by Theophrastus in his *Historia Plantarum*, lib. ix., cap. 4, that the frankincense and myrrh-trees were seen growing together in Southern Arabia.

† Specimens of two kinds of myrrh have been received from Mr. Vaughan. One, labelled *Somali* or *African Myrrh*, is the so-called *Turkey Myrrh* of commerce. The other, which is that produced forty miles to the eastward of Aden, is a gum-resin distinctly different and, as the author suggests in another communication, doubtless the produce of some other tree than that affording common myrrh. It is in irregular pieces, varying in size from that of a walnut to less than that of a pea, not coated with dust like pieces of Turkey myrrh, but having a somewhat shining exterior. Each larger piece appears to be formed by the cohesion of a number of small, rounded, somewhat transparent, externally shining, tears or drops. The fracture much resembles that of common myrrh, but wants the semicircular whitish markings. In odour and taste it agrees closely with true myrrh. Portions of a semi-transparent, brown, papyraceous bark are occasionally attached to pieces of it. I have recently noticed a small quantity of this myrrh in the hands of a London drug-broker.—D. H.

‡ This substance, of which the author has forwarded a fine specimen, is usually regarded in England as a species of myrrh of inferior quality. It was formerly known as *East Indian Myrrh*, but is now seldom so distinguished. A package from Bombay has been offered in the London market during this year as *Gum Ehesseboll*. Bissa Bôl is the *Myrrha Indica* of Drs. J. and E. Martiny (*Encyklopädie der Medicinisch-pharmaceutischen Naturalien und Rohmaterialien*, band 2, p. 98), as I found by a comparison with specimens in the possession of Dr. Julius Martiny. It is quite distinct from Indian and African Bdellium.—D. H.

§ *Gum Hotai*, judging from the sample sent to England by the author, consists of irregular

coast, where the tree affording it grows in great abundance. I believe that Olibanum is also known in Persia and in many parts of India under the name of *Kundor* and *Koodricum*, but not by the Arabs or Somalis. The *Lubán* tree is a native of the eastern coast of Africa, and flourishes on the high lands which intersect the whole of the Somali country, where I had an opportunity of seeing it in 1843, not far from Cape Gardafui. The hill-ranges on the eastern coast of Africa are composed entirely of white limestone, in some parts so compact as to resemble alabaster. This appears to be the soil most genial to the tree, and in no instance did I find it growing in sand or loam as has been supposed was the case. The tree is first met with a few miles inland from the coast, and at an altitude of about 300 feet above the level of the sea. Its appearance is strikingly singular, seeming at first sight to be destitute of roots, and clinging to the hard, uncreviced rock by masses of rhomboid and fantastically-shaped wood with the most obstinate adherence. The stem is nearly at right angles with this substructure, ascending almost invariably in an upright direction, and attaining the height of from twelve to fifteen feet. At the base, the circumference is equal to that of a man's thigh, gradually tapering towards the top where it shoots off its branches and leaves. The wood is white, fibrous and somewhat soft; the bark, which is about half an inch in thickness, is of a light brown colour, very succulent and covered with a glossy cuticle. This usually bursts or cracks with the natural increment of the tree, and may then be removed in cutaneous flakes, when it presents an appearance not unlike that of prepared oil-paper, and something akin to a similar coating observable on the English birch. The old and decayed portions of the tree assume a cinereous hue, whereby they are easily distinguishable from the younger and more healthy plants. At the proper season, incisions are made in the stem, from which the juice flows forthwith in a copious stream (frequently covering the entire stem) until the wounds are closed by the desiccation of the fluid into a gum. In this state the trees glisten in their rich investiture; and, as if vexed at being prevented from pouring forth all their store, the bark distends from the abundance of sap within. After the juice is inspissated and dried by the action of the atmosphere and the sun, it is scraped off the trees and the ground beneath, and collected by the natives, who store it in large loose heaps at particular places on the sea-coast. It is then packed in sheep and goat-skins, each parcel weighing from about twenty-eight to forty pounds, and transported on camels to the great fair held in Berbera, from whence it is either sold and then shipped in native vessels for Aden and other ports on the Arabian coast, or exported to the same places for sale. Sometimes, however, it is purchased by the Banians, and sent directly to the Bombay market in bag*galas*.*

The following are the different kinds of *Lubán* imported for sale into the Aden bazaar.

1. *Lubán Mattee*, لبان ميتي so called from Bunder Mattee the port from whence it comes. This gum is collected chiefly by the Abardagahala tribe of Somalis. The season for piercing the trees, from which it is procured, is during the north-east monsoon in the months of July and August.

2. *Lubán Hunkur*, or *Aungure*, لبان هنكر from the country of Dour Ma-

pieces 1½ to 1 inch in their longest diameter, frequently rounded on one side, as if portions of large tears, of entire smaller tears, and of angular little fragments produced by the fracture of the masses. It is of wax-like opacity, cracked in all directions, and readily breaking up into angular pieces. On the exterior, the larger pieces are yellowish, brownish, or somewhat liver-coloured, and occasionally incrusted on one side with a reddish sand, upon which they appear to have fallen when in a soft state. Internally, the colours are generally paler or nearly white, sometimes darker toward the centre of the tear. The gum is nearly inodorous, but in taste is slightly bitter and acrid to the throat. A few fragments agitated with water in a vial speedily afford an emulsion which remains frothy and milky for many days.—D. H.

* *Baggalow* or *Bugalow* (?), an Arab ship employed in carrying on the trade between Bombay, the Malabar coast and the Persian and Arabian Gulfs.—D. H.

hamed and Abardagahala Somalis, is so called from Bunder Aungure whence it is principally exported. Large quantities of this description of frankincense are brought to Aden; when picked and garbled, it sells in the market for 1½ dollars the *maund* of twenty-eight pounds. Ungarbled, the usual price for the same quantity is three-quarters of a dollar.

3. *Lubán Mákur*, لبان ماكور from the seaports of Ras Kurree, Khor Bunder, Alholu, Múrya and Bunder Khasoom, in the country of the Worsungali and Meggertein tribes of Somalis, who inhabit the extreme north-east coast of Africa about Cape Gardafui. The natives collect this gum in the months of May, June, and July. When picked, it realises 1½ dollars *per maund*; if not picked, about half that sum. Very little of this quality of gum finds its way to Aden; almost all is taken to Maculla and Shehr on the Arabian coast, from whence it is shipped direct to Bombay.

4. *Lubán Berbera*, or *Mastika*, لبان بربرا so called from the place from which it is exported. It is collected in the district inhabited by the Ayil Yunis and Ayil Hamed Somali tribes, and upwards of 3000 *maunds* are annually sent out of the country. This quality of gum is generally garbled before it is exported, and is largely used by the Arabs in their religious services. Its price in Aden is from three-quarters of a dollar to one dollar *per maund*.

5. Arabian *Lubán*, commonly called *Morbat, or Shaharree Lubán*. A large quantity of olibanum is also collected in the southern and south-eastern districts of Arabia, and exported from several towns on the coast between Ras Fartak and Marbat. This was the famous thuriferous region which proved the object of such diligent search in ancient times. The country still maintains its renown for the abundance of the drug which it yields and for its superior quality, though its value has sadly depreciated since the time of Pliny, who tells us that those who were employed in garbling it at Alexandria, were hoodwinked to prevent their coveting the precious gum.* Three *baggalas* are annually freighted from Marbat to Bombay with an entire cargo of the Arabian frankincense, which realises a higher price in the market than any of the qualities exported from Africa †

(*To be continued.*)

* "They need not to set any keepers for to looke unto those Trees that be cut, for no man will rob from his fellow if he might, so just and true they be in Arabia. But beleeve me, at Alexandria where Frankincense is tried, refined, and made for sale, men cannot looke surely ynough to their shops and work-houses, but they will be robbed. The workman that is employed about it, is all naked, save that hee hath a paire of trouses or breeches to cover his shame, and those are sowed up and sealed too, for feare of thrusting any into them. Hood-winked he is sure ynough for seeing the way too and fro, and hath a thicke coife or maske about his head, for doubt that hee should bestow any in mouth or eares. And when these workmen bee let foorth againe, they be stripped starke naked, as ever they were borne, and sent away. Whereby we may see, that the rigour of justice cannot strike so great feare into our thevves here, and make us so secure to keep our owne, as among the Sabæans, the bare reverence and religion of those woods."—*Pliny's Natural History, Holland's translation*, Lond., 1601, tome i., p. 367.

† Specimens of each of the five kinds of Olibanum above enumerated, have been received from the author:—

No. 1, called *Lubán Mattee*, is very dissimilar to any resin known in England as Olibanum. It is in stalactitic masses, which have evidently been the produce of a very copious flow of the peculiar secretion of the tree. These pieces, whose weight varies from one to three ounces, are in parts white or yellowish and highly opaque, in other parts brightly transparent. A thin, brown, paper-like bark is occasionally adherent. The *Lubán Mattee* possesses a strong, agreeable, somewhat citron-like odour and but little taste. It is closely allied in its characters to the *Tacamaque jaune huilease A.* of Guibourt (*Histoire des Drogues*, tome iii., p. 484), which is the *Resina amine* of the German pharmacologists. It comes also very close to the *Tacamaque jaune huilease B.* of Guibourt, a resin of unknown origin, in scraped pieces, which is sometimes sold in London as *Elemi*. It also nearly approaches, as Professor Guibourt informs me, the *Résine de Madagascar* of his *Histoire des Drogues*, tome iii., p. 480.

No. 3, *Lubán Mákur* is Olibanum in separate, opaque, yellowish, rather small tears, to which bark is frequently attached.

Nos. 4 and 5, *Lubán Berbera*, and the Olibanum collected in the southern and south-eastern districts of Arabia, consist of tears closely agglomerated together into darkish masses, many of the tears having a vitreous appearance when fractured.

Of *Lubán Hunkur* (No. 2), a small sample has been received.—D. H.

EXAMINATION OF PAVON'S COLLECTION OF PERUVIAN BARKS CONTAINED IN THE BRITISH MUSEUM.

BY JOHN ELIOT HOWARD, ESQ.

(*Continued from page* 180.)

ABSTRACT OF PAVON'S *THREE* LISTS IN THE HANDWRITING OF PAVON.

N.B. *The titles are not repeated when they are the same in the three lists.*

FIRST LIST.	SECOND LIST.	THIRD LIST.
	1. C. vulgo Asaharito de Loxa	*16.
	2. C. crespilla de Jaen de Loxa	*14. *27.
	3. C. fina de Loxa	
	4. C. Quiebro de Cuenca de Loxa	
	5. C. vulgo Taron—taron de Loxa	*25.
	6. C. vulgo Puchon de Loxa	*34.
	7. C. magnifolia (flor d'Azahar, vulgo)	
VIII.	8. C. rosea, Fl. Per.	
	9. C. con hojas rugosas de Loxa	*9.
	10. C. con hojas de Lucuma, 2ª esp. de Loxa	
	○+11. C. quina crespilla de Loxa	*22. C. casc. crespilla de Loxa.
	12. C. margarita vº. de Loxa	*15.
	13. C. quina con hojas de Roble de Loxa	*11.
XII. C. socchi, p. a la quina roxa de Mutis	14. C. ikotifera del Peru, p. a la roxa de Mutis	
	15. C. azahar macho vº. de Loxa	*2.
XVI. C. sp. nov. ined. de Loxa, vulgo provinciana, *es buena*	16. C. pata de Gallinazo, vº. 2º esp. de Loxa	*17.
	17. C. provinciana vº. de Loxa	
	18. C. azahar hembra vº. de Jaen de Loxa	
	19. C. casc. crespilla abumada de Loxa	*13.
	20. C. cascarilla colorada de Jaen, Loxa	
XXII. C. colorada de Jaen, sp. nov. inedit, *es buena* XIX. C. amarilla de Chito, sp. nov. de Loxa, *es buena*, inedita	21. C. casc. amarilla di Cito, Loxa	*36.
	22. C. casc. crespilla de latuna de Loxa	*18.
	23. C. quina p. a la amarilla de Mutis	
	24. C. quina p. a la buena de Loxa	*24. C. casc. crespilla p. a la buena de Loxa.
	25. C. quina con hojas un poco vellosas de los Azogues de Loxa	
	26. C. casc. de Nagena] Loxa	
	27. C. casc. serrana de Huaranda, Loxa	
	28. C. casc. con hojas de lucuma, 1ª especie	*35. Esp. de Loxa
XIV. C. rotundifolia, sp. nov. inedit. de Loxa	+29. C. con hojas de Palton de Loxa	
IV.	30. C. con hojas redondas de Quiebro de Loxa	
V.	31. C. ovata vº. p. de Gallereta e casc. bova del Peru	
XX. C. colorada del Rey, sp. nov. ined. de Loxa, *es buena*	32. C. globosa, vº. aculeata, de Guayaquil	
III.	33. C. quina colorada del Rey de Loxa	*8. C. casc. colorada del Rey de Loxa, distinta especie
XVII. C. amarilla fina del Rey de Loxa, *es buena*	34. C. purpurea del Peru	
XV. C. sp. nov. ined. vernacule chaharguera, *es buena*	35. C. quina amarilla fina del Rey de Loxa	
I.	36. C. casc. chaharguera, vº. de Loxa	*32.
	37. C. quina negra 1ª esp. de Loxa	
VI.	38. C. magnifolia, Fl. Per. de Pavon	
XVII. "*Es buena*"	39. C. sp. nova de Jaen, Loxa	
IX.	40. C. sp. nov. p. a la naranjada de Mutis, del Peru	
X.	41. C. nitida, Fl. Per.	*20. C. casc. oficinal, C. nitida, del Peru
II. "*Es buena*," XI	+42. C. lanceolata, Fl. Per.	
XIII.	+43. C. hirsuta, Fl. Per. del Peru	
XVIII. C. amarilla de Ynta, sp. nov. de Loxa, sp. nov. inedit.	+44. C. sp. nov. inedita de Loxa	
	45. C. acutifolia, Fl. Per. de Peru	
	46. C. quina amarilla de ynta de Loxa	
	47. C. cascarilla negra de Loxa, 2ª esp.	
	48. C. quina con hojas de Zambo de Loxa	*4.
	49. C. quina estoposa de Loxa	*12.
	50. C. quina lisena p. de Gallinazo, vº. de Loxa	
	○+51. C. quina crespilla de Loxa	*28.
XXI. Colorada de Huaranda, sp. nov. ined. de Loxa, *es buena*	○+52. C. cava q. crespilla de Loxa	
	○+53. C. pata de Gallinazo de Loxa	
		○+ * 5. C. casc. colorada de los Azogues de Loxa, distinta esp.
		○+ * 6. C. casc. colorada de Loxa, distinta especie
		○+ * 7. C. casc. colorada, distinta esp. de Loxa
		○+ *33. *18. C. casc. Provinciana de Jaen de Loxa
		○+ *19. C. casc. amarilla de Loxa
		*21. C. casc. negra, 2ª esp. de Loxa
		+ *23. C. casc. de Quiebro de Loxa
		○+ *26. C. casc. amarilla Uritusinga de Loxa
		○+ *29. C. casc. amarilla del Rey de Loxa
		○+ *30. C. casc. azahar hembra de Loxa
		○+ *31. C. casc. crespilla mala de macos.

MADRID, 1º *de Enero, de* 1837.

[*N.B.* In this first list, Pavon appears to have designated as *good kinds* ("*es buena*") the following:—
No. 16. Cinchona micrantha
22. C. lucumæfoliæ var.
19. C. pubescens
20. C. Condaminea colorada del Rey
17. C. Condaminea amarilla del Rey
15. C. Condaminea chaharguera
7. C. nitida
2. .....?]

[Those barks missing in the Museum are marked thus +, but the addition of ○, shows they are represented in the collection of woods.]

JOSE PAVON.

Tafalla's table, as published both in the *Bulletin* and in Lambert's work, is (as Dr. Lindley observes) useless, owing to the gross mistakes evident in the Latin names of species; but this is set right by a very obvious *restoration*. It is clear that the table could never have been constructed in its present form, but some unskilful hand has added the *brackets*, which are *evidently* foreign to the original design, and the same hand has brought down the name of the species from the *first* vernacular name against which *alone* it was originally placed, to the centre of the bracket, and thus made it include the most palpable mistakes. There is internal evidence that the corrector of the press did not even understand Latin. I have, therefore, taken the observations of Tafalla, which are valuable, and omitted all reference to the Latin names thus appended in error.

GENERAL OBSERVATIONS.

The general result of the investigations which have recently been prosecuted with so much success in this particular branch of science, has been the demonstration of the great benefit of botanical arrangement as indispensable to the knowledge of pharmaceutical products, and to the correct use of those of medicine. It is now generally admitted, that the genus *Cinchona* (as defined by Dr. Weddell), comprehends all the barks at present available for medicinal purposes; the genus *Cascarilla*† and other allied genera not hitherto furnishing any product which has been *legitimately* applied to use in medicine.

I express myself thus guardedly, because it is but too certain that these allied products are also introduced into consumption in considerable quantities. It is therefore, important to distinguish the spurious from the true medicinal barks, and I believe this can only be effected by the practical application of botanical knowledge.

I purpose in the next number to place before the reader my observations on the spurious barks included in Pavon's list, and, in the mean time, to make some remarks on the mode of distinction by *colours*, and by the names of *places*.

1. *Observations on the Colours of Barks.*

The botanists of New Granada (Mutis and Zea) distinguished their four species by the names *orange-coloured*, *yellow*, *red*, and *white*, in imitation (partly) of the previously known barks of Peru. But it so happens, that the *yellow* of Sta. Fé is not at all the yellow of Peru, and if possible, even less is it the "yellow bark" of British commerce. The *red* designation was equally unfortunate as to its identification with the *red bark* of Peruvian commerce, for the *purple-red*, C. oblongifolia of Sta. Fé had before obtained the appellation of *yellow* from the Peruvian botanists. The *white* was the only one which partially coincided in New Granada and in Peru, and this is no genuine bark at all, but the worthless *Cascarilla macrocarpa*.

The confusion thus introduced has been perpetuated, and because the *yellow bark* of Mutis was the produce of C. cordifolia, therefore the *yellow bark* of commerce§ was supposed to be *cordifolia bark*, and since the *red bark* of Mutis was the product of Cinchona (now Cascarilla) oblongifolia, the *red bark* of commerce,‖ was named in error, *oblongifolia* also.

I conclude that the authority of a great *name* (that of Mutis) first gave currency to these errors, but perhaps something was owing to the more *intelligible* character of the distinctions which he established.

These botanists of Sta. Fé named their barks from *the colour of the substance of the bark as shown in the powder*, and this feature is easily noticed by any observer.

† It seems greatly to be regretted that this name, so sure to mislead the student, is not exchanged *for some other which would convey no false idea.*

§ The produce of Cinchona Calisaya.

‖ The source still unknown.

But this was not by any means the case with the botanists of Peru, who indeed only followed the law of *custom*, which had previously established other marks of designation. Thus the distinction first made between *red* (colorada) and *yellow* (amarilla) in the king's barks of Loxa, was, to common observers, a distinction almost without a difference, and probably, simply the result of the *macho* and *hembra* varieties of the same tree. Then they had also two or three other *yellow* barks which were not *king's* barks, the spurious *yellow* mentioned above (from cascarilla oblongifolia), the *yellow* of Chito (from C. pubescens), and the *yellow* of Loxa (from C. Condaminea β Candollii), besides the *yellow* of Cuenca, the product (according to Weddell, *Hist.*, p. 74 and 72) of Lasionema Humboldtianum. It is pretty clear that none of these barks would have been named by the Sta. Fé botanists *yellow*, and those which they *would* have called yellow (following the colour of the *substance*), were quite otherwise designated.† It will be observed that the Peruvian botanists had *several* red barks in addition to the *king's* red. Now, as the *king's yellow* and *red* had the prestige of celebrity in Spain, it was necessary for Mutis to produce *yellow* and *red* bark fit for the king, from New Granada, and he accordingly named the "oblongifolia" bark *red* (roxa), though otherwise he would have given it a more appropriate appellation.

Then the "grey bark of commerce, if named according to the system of Mutis, would certainly have been the "cinnamon-coloured bark," for Ruiz and Pavon say (in their *Suplemento*, p. 47), the barks of *nitida* have a red colour like cinnamon, and assert that *all* the barks coming from Loxa valued for royal use, including, of course, the red and yellow king's barks, had this peculiar colour of the substance.‡ The best portion of that which we now call "grey bark," is called by M. Guibourt "Red bark of Lima."

Moreover, our term "grey," as given to the bark on account of the crustaceous lichens which cover it, is but an imperfect translation of the Spanish *Quina cana*, which implies the aspect of a head silvered over with age, *white* rather than *grey*.

The term *pale bark* coincides with the Spanish *cascarilla palido*, but the precise meaning of "palido" seems to be *yellowish-white*, which is correct as to the produce of C. ovata, but *in another and quite different sense*, which is thus explained by these botanists themselves.

"The external colours of the cinchona are not accidental. * * In these, as in all other trees, there are commonly external colours, one natural and proper to each species, and *different from that which proceeds from the lichens*, or small cryphogamous plants which grow on its trunks and boughs, and cause those patches with which the natural colours are varied; as is seen in the *Populus alba* or white Poplar, in the *Populus tremula* or aspen, and in the *Populus nigra*, or black Poplar; in the Ulmus campestris or common elm, and in the Ulmus pumila. And though the natural colour may vary somewhat by reason of soil and climate, this will only be into a more or less lively shade, or in being spotted with a variety of lichens, so that, notwithstanding these accidental circumstances, the botanist, or even the most rustic labourer may learn to distinguish the species of tree, as the white or black Poplar. The *Quinas finas* of Loxa, and the other Peruvian sorts, have always presented *the same external colour*, although spotted with various lichens.

"According to this incontrovertible principle, *the external colours of the barks* of the cinchonas, although not sufficient by themselves, as you insinuate whilst speaking of their internal colours, are not, on the other hand, of so little importance as Dr. Mutis

† "The barks of *nitida* have a red colour like cinnamon, a bitter more grateful than that of the *lanceolata*, and not so pungent. The internal colour of the lanceolata is a *clear buff, golden yellow*."—*Suplemento*, p. 47.

This bark, very similar to the *orange-coloured* of Mutis, was named "lampigna," or "glabra," smooth from its outer surface.

‡ "The Quina naranjada of Sta. Fé neither is nor can be the *primitiva*, since all the authors of the first times *attribute to it* [the primitiva] *the red colour of cinnamon*; and, without intermission, bark of this colour, as of superior quality, has been sent from Loxa to the Royal Pharmacy, and *there is no account that they ever used in it any of the colour of orange, nor of any other yellow more or less deep.*"—*Suplemento*, p. 112.

and yourself (Zea) have imagined. Our barks, as well as those of Santa Fé, not only differ from each other by the internal colours, but by the external and by the remaining marks or characters which present notable differences."—*Suplemento*, p. 34.

It must therefore be borne in mind, that bark may be named either from the colour which its *powder* makes, which is the method of Mutis and Zea, or from the external peculiar tint of *the coat*, which is that of Ruiz and Pavon, or from the accidental adhesion of white or black *lichens*, a practice which custom has established. The method of the botanists of Sta. Fé, though open to objections, merits this preference over the second, that it is capable of being generally appreciated, whilst the second is certainly not thus *obvious*, though I believe very *correct*. The third method is altogether deceptive.

There are two more circumstances to be borne in mind in reference to the designation of barks by their colour. The *first* is, that the tints are sometimes not *absolute*, but simply *relative*, as in the case of the *black* (zamba and negra) *yellow* (naranjada and amarilla) and *white* (blanca and pallida) kinds of calisaya. The second is, that the vernacular name is sometimes given from the tint of the tree (*Histoire*, &c. p. 51), as in *cascarilla verde*, *calisaya morada*, *casc. zamba morada*. This remark belongs of course only to the *country* names, and not to those of English commerce. If so happens, however, that the prevailing tint of the tree, as displayed in the flower and leaves, is often traceable also in the bark, and I have seen it curiously reproduced in analysis. It is therefore not surprising that we find in the *calisaya morada* a strong tendency to the "mulberry colour," and in the *cascarilla verde*, to glaucous green.

2. *Designation of Barks by the Names of Places.*

It would fatigue the reader to study even a portion of the difficulties which arise from this practice. In some cases, as in the "Carthagena," "Lima," and "Arica" bark, the appellation is taken from the place of shipment, where never grew a cinchona tree, in all probability, since the creation. In others, as in Loxa, Huanuco, Huamalies, Jaen, and Carabaya, the name represents very fairly the most esteemed or most prevalent product of the district. But as it is obvious to every one conversant with the subject, that various species grow in almost every locality which furnishes this precious product of nature, there often arises great confusion from two or three kinds being named after the same place. Thus Cusco, the royal city of the Incas, has come to signify almost everything mean and base, for in Peru it is the produce of C. scrobiculata, which is so called in France; the C. pubescens, var. Pelletierana; and in English commerce not only this last, but other barks of similar low estimation. "Carthagena bark" is a general name in English commerce for the produce of C. lancifolia and of C. cordifolia, and when the product of C. lanceolata is shipped from a port on the Pacific, this, from its resemblance to C. lancifolia, is also called "Carthagena bark."† Pitaya bark, so named from an obscure locality, is at one time the product of the Condaminea var. Pitayensis, at another a variety of C. lancifolia, at another an unknown false Pitaya bark, and again at another the Quina bicolorata of Brera, the product of a tree wholly foreign to the Cinchona, and then the Piton bark, though having some resemblance in sound, is entirely a different thing from all these varieties, being the product of *Exostemma floribundum*, and named from a term used in St. Domingo (where it was found) for *the summit of the mountains*. Such are some of the difficulties which attend this subject, difficult enough in itself, without the addition of *extraneous* sources of confusion.

(*To be continued*).

† Don Francesco Zea says: "The four (barks) which are known at present are the orange-coloured, the red, the yellow, and the white, simple designations *taken from the internal colour of the bark*." On which the authors of the *Suplemento* remark: "The supposition that only four officinal barks are yet known must be understood with respect to those of Sta. Fé, since those used in Spain in medicine are more numerous, so that the names derived from the colours *orange*, *red*, *yellow*, and *white*, can only serve for the four barks of Sta. Fé discovered up to this time. Moreover, the designations taken from colours are in truth simple, but also by themselves very confusing, since there exist different species which have the colour of carmine, more or less vivid, a more or less deep yellow tint, a cinnamon red more or less lively, also buff colour, tawny, bay, &c., more or less conspicuous. They cannot be marks of easy distinction among doubtful nor among professors, neither are the names commonly adopted in commerce of more avail.

"The name *naranjada* belongs to no species, since it must be understood of the colour which oranges have when ripe, and by no means of the various colours which they assume in all stages of growth. The appellation *blanca* is so improperly given, that it can only be called white in respect of the tint (*con respecto a la tinta*), since its interior colour is more or less reddish in some barks, in others of a reddish fawn, and in others it approaches to cinnamon colour."—*Suplemento*, p. 35.

"The term roxa is common to the Quina colorada, to the Quinon of commerce, and to the Cinchona lucifera of Tafalla, and it corresponds better to these than to the Quina Anahar [the C. oblongifolia or red bark of Mutis.]"—*Suplemento*, p. 36.

EXTRACT OF COLOCYNTH AND COMPOUND COLOCYNTH PILL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—My object in addressing you, is to call the attention of Pharmaceutists to the preparations Extract of Colocynth, and Compound Colocynth Pill, of the London Pharmacopœia of 1851. If the directions given for the preparation of the former be strictly adhered to, a substance is produced, which has all the characteristics of Colocynthine, a fact which seems to have escaped the notice of the translators of the Pharmacopœia, whose works I have consulted, for they all, with the exception of Mr. Squire, not only identify the new extract with the old, but order it to be administered in similar doses.

In the Compound Colocynth Pill, the quantity of extract of colocynth ordered appears to me much too large in proportion to the other ingredients, but as this is a question which I think can only be settled after being fully discussed, I purpose introducing it at the next Meeting of the Pharmaceutical Society, in order that as much information as possible may be elicited from the Members.

I am, Sir, your obedient Servant,

ALFRED ALLCHIN, F.C.S.

REPORT UPON ORIGINAL GRAVITIES.

BY PROFESSORS GRAHAM, HOFMANN, AND REDWOOD.

[This Report contains the results of an Investigation undertaken by desire of the Secretary of State. It is addressed to the Chairman of the Board of Inland Revenue.]

(*Continued from page* 173.)

THE two experimental data required to furnish means of determining the original gravity of beer, by the process already described, are obtained with great precision when proper care is taken. One of these data, however, namely, the spirit-indication of the beer, involves the distillation of the beer and the collection of the whole alcohol without loss—a delicate process, which it has been attempted to supersede by operations of less difficulty and nicety. One of these operations, long practised by the German brewers, has been examined and recommended by Balling, and has also been investigated by Messrs. Dobson and Phillips, under whose notice it appears to have been first brought as a method which Mr. Stevenson, of Edinburgh, had suggested and attempted to carry out.

The object is still to obtain the spirit-indication of the beer. The specific gravity of the beer is first observed by means of the hydrometer or weighing-bottle. The extract gravity of the beer is next observed, as in the former method; but the beer for this purpose may be boiled in an open glass flask till the spirits are gone, as the new process does not require the spirits to be collected. The spiritless liquid remaining is then made up to the original

† The "*brown Carthagena* bark" of M. Guibourt, H.D. iii., 126, is, however, *Pitaya* bark, *i. e.* *Condaminea-pitaya*.

volume of the beer as before. By losing its spirits, the beer of course always increases in gravity, and the more so the richer in alcohol the beer has been. The difference between the two gravities is the new spirit-indication, and is obtained by subtracting the beer gravity from the extract gravity, which last is always the higher number.

The data in a particular beer were as follows:—

Extract gravity	1044.7
Beer gravity.....	1035.1
Spirit-indication	9.6 degrees.

Now the same beer gave by distillation, or the former method, a spirit-indication of 9.9 degrees. The new spirit-indication by evaporation is, therefore, less by 0.3 degree than the old indication by distillation. The means were obtained of comparing the two indications given by the same fermented wort or beer in several hundred cases, by adopting the practice of boiling the beer in a retort, instead of an open flask or basin, and collecting the alcohol at the same time. The evaporation uniformly indicated a quantity of spirits in the beer nearly the same as was obtained by distillation, but always sensibly less, as in the preceding instance. These experiments being made upon fermented liquids of known original gravity, the relation could always be observed between the new spirit-indication and the degrees of specific gravity lost by the beer. Tables of the degrees of spirit-indication with their corresponding degrees of gravity lost, were thus constructed, exactly in the same manner as the Tables which precede; and these new Tables may be applied in the same way to ascertain the original gravity of any specimen of beer. Having found the degrees of spirit-indication of the beer, by evaporation, the corresponding degrees of gravity lost are taken from the Table, and adding these degrees to the extract gravity of the beer, also observed, the Original Gravity is found. Thus the spirit-indication (by the evaporation method) of the beer lately referred to was 9.6 degrees, which mark 43 degrees of gravity lost in the new Tables. Adding these to 1044.7, the extract gravity of the same beer, 1087.7 is obtained as the Original Gravity of the beer.

As the numbers of the second set of Tables belonging to the evaporation process are derived from the same fermentations of cane-sugar, starch-sugar, and malt in different conditions, as supplied the first series of Tables, they give the means of forming a strict comparison between the spirit-indications obtained by the two processes.

The want of coincidence between the two sets of Tables requires explanation. The same degrees of gravity lost give less spirit, or, in other words, the same spirits or degrees of spirit-indication always give more degrees of gravity lost in the Evaporation Tables, principally from this circumstance. When alcohol is added to pure water, the density of the latter undergoes a certain diminution. By an addition of eight per cent. by weight of alcohol the density of water is reduced from 1000 to 986.7, which is a loss of gravity of 13.3 degrees. But eight per cent. of alcohol in the same volume as before of water containing ten per cent. of cane-sugar, occasions a loss of gravity of only 12.92 degrees (a fall from 1036.47 to 1023.55). The degrees of spirit-indication obtained are, therefore, less from the same absolute quantity of spirit in the sugar solution than in pure water. Now the sugar solution containing alcohol represents the beer, and gives the loss of gravity which the beer sustains by evaporation. On the other hand, the first mixture of pure water and alcohol represents the dilute spirits obtained from the same beer by distillation. The results here are—

Degrees of spirit-indication	13.30, by distillation.
" " "	12.92, by evaporation
Difference.....	0.38

It thus appears that alcohol reduces the gravity of a solution of sugar, or we may suppose infusion of malt, not quite so much, by a small quantity, as it reduces the gravity of water. It has hitherto been believed that alcohol has the same effect upon the density of saccharine solutions as upon water, in which case the spirit-indications obtained from beer by the evaporation and distillation methods should necessarily be the same. But it appears from the following series of experiments on the subject, that a sensibly greater condensation always occurs when spirits are mixed with saccharine solutions than with water.

TABLE XIII.—SUGAR dissolved in SPIRITS, Compared with Sugar dissolved in Equal Volumes of WATER.

ALCOHOL in 100 parts of Solvent.	SUGAR, added to 100 parts of Solvent.	Specific gravity of Solvent.	Specific gravity of Solution.	Spirit-Indication in Water.	Spirit-Indication in Solution of Sugar.
0	5	1000	1018.83		
2	5	996.35	1015.19	3.65	3.64
4	5	992.80	1011.74	7.20	7.09
6	5	989.63	1008.52	10.37	10.31
8	5	986.76	1005.70	13.24	13.13
10	5	983.91	1002.91	16.09	15.92
12	5	981.23	1000.35	18.77	18.48
0	10	1000	1036.47		
2	10	996.35	1032.98	3.65	3.57
4	10	992.80	1029.49	7.20	6.98
6	10	989.63	1026.31	10.37	10.16
8	10	986.76	1023.56	13.24	12.91
10	10	983.91	1020.77	16.09	15.70
12	10	981 23	1018.23	18.77	18.24
0	15	1000	1055		
2	15	996.35	1049.54	3.65	3.46
4	15	992.80	1046.24	7.20	6.76
6	15	989.63	1043.20	10.37	9.80
8	15	986.76	1040.42	13.24	12.58
10	15	983.91	1037.63	16.09	15.37
12	15	981.23	1035.06	18.77	17.94
0	20	1000	1068.62		
2	20	996.35	1063.26	3.65	3.36
4	20	992.80	1061.99	7.20	6.63
6	20	989.63	1059.06	10.37	9.96
8	20	986.76	1056.31	13.24	12.31
10	20	983.91	1053.52	16.09	15.10
12	20	981.23	1050.82	18.77	17.89

This increased condensation, although small in amount, will be found quite sufficient to account for the difference, amounting to about 1.3 degrees of gravity in the higher numbers, which holds between the gravities lost, corresponding to the same degrees of spirit-indication in the two series of Tables. To obtain the correct original gravity of beer, it is therefore necessary to make use of the proper Table, according as the spirit-indication of the beer has been obtained by the distillation or by the evaporation method. The degrees of gravity lost thus found, are added to the extract gravity, which is the same in both modes of examination.

Although the evaporation process is the easiest in practice, yet it does not appear to admit of the same degree of precision as the distillation process. In two experiments made upon the same beer, a difference of 0.4 or 0.5 degree of original gravity is not unusual with the evaporation, instead of the coincidence almost perfect, which holds in the repetition of the distillation. It is believed

that the imperfect result of the evaporation depends chiefly upon the difficulty of observing with accuracy the specific gravity of a frothing liquid like beer, which is one of the data. The carbonic acid in the beer can have little influence, otherwise, on the result, for it seldom constitutes more than one five-hundredth part of the whole weight of the beer. The gravity of the dissolved carbonic acid appears to exceed a little only that of water, so that although the former is driven off entirely in the boiling it is replaced afterwards by a liquid (water) of nearly equal density, when the extract gravity is observed. The carbonic acid, therefore, is reckoned as so much water in the beer.

The Tables of the mean results obtained from the various worts by the evaporation process are now subjoined.

TABLE XIV.—CANE-SUGAR.

Degrees of Spirit-Indication, with corresponding degrees of Gravity lost.

Degrees of Spirit-Indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	—	.2	.4	.6	.8	1.0	1.2	1.4	1.7	2.0
1	2.3	2.6	3.0	3.3	3.7	4.0	4.4	4.7	5.0	5.4
2	5.8	6.1	6.5	6.9	7.3	7.7	8.1	8.5	8.9	9.4
3	9.9	10.4	10.8	11.3	11.7	12.2	12.6	13.1	13.6	14.0
4	14.4	14.8	15.3	15.7	16.2	16.6	17.0	17.4	17.8	18.2
5	18.7	19.1	19.6	20.0	20.4	20.9	21.4	21.9	22.4	22.9
6	23.4	23.8	24.3	24.8	25.2	25.7	26.1	26.6	27.1	27.6
7	28.1	28.5	29.0	29.5	29.9	30.4	30.8	31.3	31.8	32.3
8	32.8	33.3	33.8	34.3	34.8	35.3	35.8	36.3	36.8	37.3
9	37.8	38.3	38.8	39.3	39.8	40.3	40.8	41.3	41.8	42.3
10	42.8	43.3	43.9	44.4	45.0	45.6	46.1	46.7	47.3	47.9
11	48.5									

TABLE XV.—STARCH-SUGAR.

Degrees of Spirit Indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	—	.3	.6	.9	1.2	1.5	1.8	2.2	2.5	2.9
1	3.2	3.6	4.0	4.3	4.7	5.1	5.5	5.9	6.3	6.7
2	7.1	7.5	7.9	8.4	8.8	9.2	9.6	10.0	10.4	10.8
3	11.3	11.7	12.1	12.6	13.0	13.5	13.9	14.3	14.7	15.1
4	15.6	16.0	16.5	16.9	17.4	17.8	18.3	18.7	19.1	19.5
5	20.0	20.4	20.9	21.3	21.8	22.2	22.7	23.2	23.7	24.2
6	24.7	25.1	25.6	26.1	26.6	27.1	27.6	28.1	28.6	29.1
7	29.7	30.0	30.5	31.0	31.5	32.0	32.5	33.0	33.5	34.0
8	34.4	34.9	35.5	36.0	36.5	37.1	37.6	38.1	38.6	39.1
9	39.6	40.2	40.7	41.2	41.7	42.3	42.8	43.3	43.8	44.3
10	44.8	45.3	45.9	46.4	47.0	47.5	48.0	48.6	49.1	49.6

TABLE XVI.—MALT WORT WITHOUT HOPS.

Degrees of Spirit-Indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	—	.3	.7	1.1	1.5	1.9	2.3	2.7	3.1	3.5
1	3.9	4.3	4.7	5.1	5.5	5.9	6.3	6.7	7.1	7.5
2	8.0	8.4	8.8	9.2	9.6	10.0	10.4	10.8	11.2	11.6
3	12.0	12.4	12.9	13.3	13.7	14.2	14.6	15.0	15.4	15.8
4	16.3	16.7	17.1	17.5	18.0	18.4	18.8	19.2	19.6	20.0
5	20.5	21.0	21.4	21.9	22.3	22.8	23.2	23.7	24.1	24.5
6	25.0	25.4	25.9	26.4	26.9	27.3	27.8	28.3	28.8	29.3
7	29.8	30.3	30.8	31.3	31.8	32.3	32.8	33.3	33.8	34.2
8	34.8	35.4	36.0	36.6	37.2	37.8	38.4	39.0	39.6	40.2
9	40.8									

TABLE XVII.—MALT WORT WITH HOPS.

Degrees of Spirit-Indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	—	.3	.6	.9	1.2	1.5	1.8	2.1	2.4	2.7
1	3.0	3.3	3.7	4.1	4.4	4.8	5.1	5.5	5.9	6.3
2	6.7	7.2	7.6	8.0	8.4	8.8	9.2	9.6	10.0	10.4
3	10.8	11.2	11.7	12.1	12.6	13.0	13.4	13.8	14.2	14.6
4	15.0	15.4	15.9	16.3	16.8	17.2	17.7	18.1	18.6	19.0
5	19.4	19.8	20.3	20.7	21.2	21.6	22.1	22.5	22.9	23.3
6	23.8	24.2	24.7	25.1	25.6	26.0	26.5	26.9	27.4	27.8
7	28.3	28.7	29.2	29.7	30.2	30.7	31.2	31.7	32.2	32.7
8	33.2									

TABLE XVIII.—BROWN AND PALE MALT WORTS.

Degrees of Spirit-Indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	—	.3	.7	1.0	1.4	1.8	2.2	2.6	3.0	3.4
1	3.8	4.2	4.6	5.0	5.4	5.8	6.2	6.6	7.1	7.5
2	7.9	8.3	8.8	9.2	9.6	10.0	10.4	10.8	11.2	11.6
3	12.0	12.4	12.9	13.3	13.7	14.1	14.5	15.0	15.4	15.8
4	16.2	16.6	17.0	17.5	17.9	18.4	18.8	19.3	19.7	20.1
5	20.5	20.9	21.4	21.8	22.3	22.7	23.2	23.6	24.1	24.6
6	25.0	25.4	25.9	26.3	26.8	27.2	27.7	28.2	28.7	29.1
7	29.6	30.0	30.5	30.9	31.4	31.9	32.3	32.8	33.3	33.8
8	34.4									

TABLE XIX.—VARIOUS WORTS: Mean of Tables XV., XVI., XVII., & XVIII.

Degrees of Spirit-Indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	—	.3	.7	1.0	1.4	1.7	2.1	2.4	2.8	3.1
1	3.5	3.8	4.2	4.6	5.0	5.4	5.8	6.2	6.6	7.0
2	7.4	7.8	8.2	8.7	9.1	9.5	9.9	10.3	10.7	11.1
3	11.5	11.9	12.4	12.8	13.2	13.6	14.0	14.4	14.8	15.3
4	15.8	16.2	16.6	17.0	17.4	17.9	18.4	18.8	19.3	19.8
5	20.1	20.5	21.0	21.4	21.9	22.3	22.8	23.2	23.7	24.1
6	24.6	25.0	25.5	26.0	26.4	26.9	27.3	27.8	28.3	28.8
7	29.3	29.7	30.2	30.7	31.2	31.7	32.2	32.7	33.2	33.7
8	34.2	34.7	35.3	35.9	36.5	37.1	37.7	38.3	38.9	39.5
9	40.1									
10	44.8									

TABLE XX.—MEAN OF TABLES XV., XVI., XVII., and XVIII.

	1	2	3	4	5	6	7	8	9	10
No. XV.	3.2	7.1	11.3	15.6	20.0	24.7	29.6	34.4	39.6	44.8
XVI.	3.9	8.0	12.0	16.3	20.5	25.0	29.8	34.8	40.8	
XVII.	3.0	6.7	10.8	15.0	19.4	23.8	28.3	33.2		
XVIII.	3.8	7.9	12.0	16.2	20.5	25.0	29.6	34.4		
Mean	3.5	7.4	11.5	15.8	20.1	24.6	29.3	34.2	40.2	

TABLE XXI.—MALT WORT OF HIGH ORIGINAL GRAVITY WITH HOPS.

Degrees of Spirit-indication.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0										
1										
2										
3										
4										
5	21.0	21.4	21.9	22.3	22.8	23.2	23.7	24.1	24.6	25.0
6	25.4	25.9	26.3	26.8	27.3	27.8	28.2	28.7	29.1	29.6
7	30.0	30.5	30.9	31.4	31.9	32.3	32.8	33.3	33.8	34.3
8	34.8	35.3	35.8	36.3	36.8	37.3	37.8	38.3	38.8	39.3
9	39.8	40.3	40.8	41.4	41.9	42.4	43.0	43.5	44.0	44.5
10	45.0	45.5	46.1	46.6	47.2	47.7	48.2	48.7	49.3	49.8
11	50.3	50.9	51.4	51.9	52.5	53.0	53.5	54.0	54.5	55.0
12	55.6	56.2	56.7	57.3	57.8	58.3	58.9	59.4	59.9	60.5
13	61.0	61.6	62.1	62.7	63.2	63.8	64.3	64.9	65.4	66.0
14	66.5	67.0	67.6	68.1	68.7	69.2	69.8	70.4	70.9	71.4
15	72.0									

In the examination of fermented liquids, the acetic acid present should not be overlooked, as the influence of this constituent upon the original gravity of some kinds of beer, particularly old and hard beer, is often considerable. There is, however, a certain amount of acid present in all healthy fermentations, and this, in the experiments on which our tables have been founded, was estimated at one part of absolute acetic acid ($C_4 H_4 O_4$) in one thousand parts of wort. Any excess of acid beyond this should be ascertained by neutralizing the beer by an alkaline test-solution. Sixty parts (one equivalent) of acetic acid represent 46 parts of absolute alcohol; a proportion by which the weight of alcohol, which has disappeared in the formation of acetic acid, is calculated. This corresponding weight of alcohol has a certain spirit-indication, which is to be added to the spirit-indication of the beer itself before the degrees of gravity lost are taken from the table. The calculated original gravity of old beers is often thus very sensibly increased.

The Tables for calculating original gravities, constructed by Messrs. Dobson and Phillips, were deduced by these gentlemen from observations made upon several different saccharine solutions of known original gravity submitted to fermentation, and are the same in principle as the Tables given in this Report. The old observations appear to have been made with the greatest care and accuracy, and the Table founded upon them, which has been used by the Excise for some time, is almost identical with Table A, in the Appendix, which we now give as the result of the more numerous and varied experiments subsequently instituted during the present inquiry.

The process of Professor Balling, of Prague, for ascertaining original gravities, forms a part of a general method of analyzing beer which the author has developed in his great work upon Brewing.* The method is remarkable for the number of valuable results which are deduced by calculation from simple observations of the physical properties of the beer, chiefly made by means of the saccharometer. The chemical properties of the extractive matter are not investigated, and the source of the anomalies in the densities of fermented liquids are, therefore, left in the dark. But a certain number of observations have been made on the relation and dependence of the densities of the wort,

* *Die Gährungschemie wissenschaftlich begründet und in ihrer Anwendung auf die Weinbereitung, Bierbrauerei, Branntweinbrennerei und Hefenerzeugung praktisch dargestellt.* Von Carl J. N. Balling. Prague, 1845. Or the shorter Treatise by the same author—*Die Saccharometrische Bier-und Branntweinmeischprobe.* Prague, 1846.

alcohol, and extractive matter, of particular fermented liquids. These observations afford empirical data for reaching the original gravity, by means of a process of calculation, which is highly remarkable for its ingenuity and success, considering the limited knowledge of the actual chemical changes involved in fermentation. In several samples of beer, to which the formula of Balling was applied by us, it was found to give an original gravity within a single degree of the truth.

Every facility and assistance in pursuing the necessary inquiries respecting fermentation on a large scale were afforded to us by the Trade, and we have much pleasure in acknowledging our obligations both to the partners and principal officers of the houses of Messrs. Abbott & Son; Combe, Delafield, & Co.; Furze & Son; Reid & Co.; Thorne & Co.; Truman, Hanbury, & Buxton; and Whitbread & Co., of London; and to Messrs. Allsopp & Sons, and Bass & Co., of Burton. We thus obtained the means of verifying the correctness of the original gravities calculated from our tables, by means of specimens of beer of which the original gravity of the worts had been noted with sufficient accuracy, and which had been preserved for a considerable length of time. A series of experiments which had been made by Mr. Crockford of the Long Acre Brewery, expressly with a view of illustrating the subject of original gravities, and which he placed without reserve at our disposal, and also a long series of most careful observations made by Mr. Bottinger in Messrs. Allsopp's brewery, were particularly pertinent to the inquiry, and afforded a satisfactory confirmation of the sufficiency of the methods.

The methods of determining original gravities already described are essentially empirical. But the investigations respecting the nature of the process of fermentation, into which they have led, suggested the principle upon which the rational process should be founded, and which deserves to be explained for the better illustration of the subject. This process is chiefly interesting in a scientific point of view, as it is too operose and delicate in the form in which it can be at present offered, to supersede the preceding methods which are recommended for practice.

The fact has already been insisted upon, that the alcohol obtained from beer represents a perfectly definite quantity of starch-sugar and nothing else; and so furnishes a portion of the original gravity which is clear and indisputable. The difficulty is with that portion of the original gravity which is represented by the solid matter remaining in the beer. Here also the difficulty would vanish, if that solid matter were either all starch-sugar (which it never is), or entirely composed of the extractive matter already described, as frequently occurs in old hard beer. The gravities of solutions of starch-sugar and of the extractive matter are different, but are now both fully known. If the solid matter of the beer consisted entirely of the former substance, then the original gravity of the beer would be that of the joint amount of the starch-sugar actually found in the beer, and of that represented by the alcohol of the beer, the whole quantity of sugar being dissolved in water and having the original volume of the beer. The only further information required might be obtained from a Table of the gravities of solutions of starch-sugar. The specific gravity thus found of the solution of starch-sugar in question represents the original gravity of the beer.

On the second supposition, that the solid matter of the beer was all extractive matter (without sugar), then the reference should be made to a Table of the specific gravities of solutions of different proportions of that substance, such as Table V., page 9, but more extended. In a parallel column the gravities of solutions of starch-sugar possessing the same quantity of carbon as the extractive, and corresponding to it, would be placed, and in another column the quantities of starch-sugar in the former solutions of that substance. Such a Table would

give at once, therefore, the quantity of starch-sugar corresponding to the extractive, and adding the quantity of starch-sugar represented by the alcohol of the beer, the entire quantity of starch-sugar becomes known, and the original gravity is found from it as in the preceding case.

The problem, therefore, may be solved in the two extreme conditions of the beer which have been supposed. The real difficulty is with the intermediate condition, which is also the most frequent one, where the solid matter of the beer is partly starch-sugar and partly extractive; for no accurate chemical means are known of separating these substances and so determining the quantity of each in the mixture.

But a remedy presented itself. The fermentation of the beer was completed by the addition of yeast, and the constituents of the beer were thus reduced to alcohol and extractive only, from which the original gravity, as is seen, can be calculated.

For this purpose a small but known measure of the beer, such as four fluid ounces, was carefully deprived of spirits by distillation, in a glass retort. To the fluid when cooled a charge of fresh yeast, amounting to 150 grains, was added, and the mixture kept at 80° for a period of sixteen hours. Care was taken to connect the retort, from the commencement, with a tube condenser, so that the alcoholic vapour which exhaled from the wash during fermentation should not be lost. When the fermentation had entirely ceased, heat was applied to the retort to distil off the alcohol; which was collected in a cooled receiver. About three-fifths of the liquid were distilled over for this purpose; and the volume of the distillate was then made up with water to the original volume of the beer. The specific gravity of the last spirituous liquid was now taken, by the weighing bottle. To obtain a correction for the small quantity of alcohol unavoidably introduced by the yeast, a parallel experiment was made with that substance. The same weight of yeast was mixed with water and distilled in another similar retort. The volume of this second distillate was also made up by water to the beer-volume; its specific gravity observed, and deducted from that of the preceding spirituous liquid. This alcohol was added to that obtained in the first distillation of the beer, and the weight of starch-sugar corresponding to the whole amount of alcohol was calculated. This was the first result.

For the solid matter of the beer: the spiritless liquid remaining in the retort was made up with water to the beer-volume, and the specific gravity observed. A correction was also required here for the yeast, which is obtained, by making up the water and yeast, distilled in the second retort, to the original volume of the beer, and deducting the gravity of this fluid from the other. The quantity of starch-sugar corresponding to this corrected gravity of the extractive matter was now furnished by the Table. This was the second result.

The two quantities of starch-sugar thus obtained were added together. The specific gravity of the solution of the whole amount of starch-sugar, as found in the Table, represented the original gravity of the beer.

This method must give an original gravity slightly higher than the truth, owing to the circumstance that the dextrin, albumen, and salts, which are found among the solid matters dissolved in beer, are treated as having the low gravity of extractive matter, and accordingly amplified by about one-sixth, like that substance, in allowing for them ultimately as starch-sugar. The error from this source, however, is inconsiderable. It is to be further observed that the error from imperfect manipulation, of which there is most risk in the process, is leaving a little sugar in the extractive matter from incomplete fermentation. This accident also increases the original gravity deduced. The process has given results which are remarkably uniform, and is valuable in the scientific investigation of the subject, although not of that ready and easy execution which is necessary for ordinary practice, and which recommends the former method. That method, in its two modifications, has been sufficiently described in the preceding pages, and it now only remains to append the Tables required for its application, which embody the general results of the inquiry.

London, August 16, 1852.

RESEARCHES ON THE COLOURING PRINCIPLE OF URINE—EXISTENCE OF IRON IN THAT LIQUID.

BY GEORGE HARLEY, M.D.

Vice-President of the Parisian Medical Society; Ext. Member of the Royal Medical Society of Edinburgh, &c.

The most obvious character possessed by all extractive matter, whether obtained from the animal fluids or solid tissues, is its colour; and it is much to be regretted that notwithstanding the improved methods of investigation in Physiological Chemistry, the term extractive matter has still to be so frequently employed by practical Chemists to designate those bodies which, whether existing preformed, or chemically produced, possess few or no distinguishing characters, being uncrystallizable, incapable of forming a crystallizable or stoichiometrical compound with other substances, &c., and therefore cannot be separated or exhibited in a pure state. In this class the colouring matter of urine, and it may be several other substances, are involved.

The nature of the pigment which bestows upon urine, and urinary sediments, their colour, has hitherto never been properly understood in consequence, of observers being unable to separate it from the other substances to which it tenaciously adheres, sharing their solubility and insolubility. "Experiments have often been commenced upon this substance, but the difficulties which present themselves in the investigation are so numerous that most experimentalists have soon resigned it, and directed their labours to some more productive department of chemistry. It unfortunately happens that no certain chemical differences can be detected between urines presenting the most striking difference of colour to the eye of the clinical physician."*

In a paper such as this it would be out of place to give details respecting the nature of the substances which have been described as imparting to urine its red or yellow tint; suffice to say that the colouring matter of urine has been called and described as purpurate of ammonia by Prout, purpurine by Bird, uroerythin by Simon, urrhodin by Stoller, uroxanthin by Heller,† and more lately as urine pigment by Scherer.‡

None of these observers are agreed as to its nature, but this difference of opinion cannot be wondered at when we consider that none of them ever obtained the pigment in a pure state so as to be able to submit it to exact chemical examination. By the following process I have obtained it pure, and after a careful study of its properties have come to the conclusion that it is a modification of the hæmatin which exists in the blood, and like it containing iron, as I have been able to demonstrate by taking the residue after combustion, dissolving it in hydrochloric acid, and adding the usual tests for that metal, when the characteristic colours are immediately produced. In operating on urine I have not confined myself to that of man alone, but also employed the urine of several of the lower animals, such as the ox, horse, pig, &c., and in all of them I have found iron existing as a normal constituent combined with the colouring matter. This, as will be afterwards seen, is a most important observation.

The method I employ to obtain the colouring principle of urine in a state

* Lehmann's *Physiological Chemistry*, translated by Dr. Day, vol. i., page 318.

† *Arch. f. Chem. u. Mikrosk*, Bd. 2, S. 161, 173.

‡ *Ann. d. Ch. u. Pharm.*, Bd. 57, S. 180, 195.

of purity, consists in evaporating a very large quantity of urine almost to dryness, taking care during the process to remove the chloride of sodium and other salts, which by crystallizing in great abundance in the bottom of the vessel, and on the surface of the liquid, greatly retard evaporation. When the urine has been evaporated till there remains in the vessel a semifluid matter having somewhat the colour and consistence of molasses, it is removed from the water-bath, and alcohol is added to extract the colouring matter. The alcohol on becoming saturated is decanted into another vessel, and the residue is treated with fresh quantities till it ceases to yield colouring matter. The alcoholic extract having a dark red colour is heated till it boils, and whilst boiling, slacked lime is added in small quantities at a time till the liquid becomes decolorized, the vessel being well shaken after each addition; an excess of lime is to be avoided, as it renders the after part of the process more difficult. The decolorized liquid is now filtered to obtain the compound of lime and colouring matter which remains on the filter, and the alcohol which passes through carries with it fats, a little colouring matter, &c. This compound, having been well dried, is repeatedly washed with boiling ether, to free it still further from fats, of which there is always a considerable quantity in urine. This treatment is continued till a portion of the washings no longer leaves a fatty stain when evaporated in a watch-glass. After the lime compound has been again dried, it is acted upon by hydrochloric acid, which decomposes it, and sets free the colouring matter, and the treatment with alcohol is repeated to separate it from the lime. After filtration ether is added to the solution in about equal parts, and the mixture is allowed to stand for a few days to insure that as much as possible of the pigment be taken up by the ether; on the addition of water the combination of ether and colouring matter forms a distinct upper layer which is removed without difficulty. The ethereal solution thus obtained has a rich port wine colour, and contains the pigment in a pure state, with the exception, perhaps, of a very slight trace of acid, should the hydrochloric acid have been added in excess. To free it from this it is put into a funnel, the small end of which had been stopped by the finger, and distilled water poured upon it; the water combines with the acid, and sinks to the lower part of the funnel, from which it is withdrawn by partially removing the finger. In the process of washing, care must be taken not to add an excess of water, as it precipitates some of the colouring matter. All that now remains to be done with the ethereal solution is to distil or evaporate the ether, and there is left the pigment, which, on being dried, appears as a brownish-black glistening mass.

The colouring matter of urine thus obtained is insoluble in water, soluble in alcohol and ether, separately or combined, more freely soluble in absolute alcohol. The presence of fat or oil adds greatly to its solubility. On being burned it evolves an odour similar to burning horn, and leaves a slight residue soluble in hydrochloric acid, which is recognized to be a salt of iron by the ferrocyand. pot., and ferricyand. pot. giving with this solution the one a pale blue, and the other Prussian blue. The sulpho cyand. pot. gives a fine red colour. In consequence of an accident I am unable at present to give an ultimate analysis with the exact numbers of the elements contained in it; suffice it to say that it contains carbon, hydrogen, oxygen, nitrogen, and iron. These properties prove the very close resemblance which it bears to blood hæmatin, and justify me in considering it a modified form of that substance, the only difference appearing to be in the quantity of iron which it contains. The colouring principle of the bile and also melanin bear the same close resemblance to the hæmatin of the blood as urine pigment, the amount of iron in bile pigment seems to be less, while in melanin it is greater. I found as much as one and a half per cent. of iron in melanin prepared from a melanotic tumour taken from a horse. A most remarkable character possessed by all of these pigments when pure is that they are insoluble in the stronger acids, as acetic, nitric, hydrochloric, and even sulphuric acid. The colouring matters of plants are very nearly allied to those of animals, as will be seen from researches now in print made by my former teacher, M. Verdeil, who has lately devoted much of his time to the investigation of this interesting subject, and with the most satisfactory results.

Having, as I hope, given a satisfactory answer to the question, "What is the colouring principle of urine?" and given a process by which it may be obtained in a state of purity, I will leave the subject till a future period, when I hope to be able to explain it more minutely.

Paris, 28th Sept., 1852.

ON THE FLUORESCENCE OF QUINIFEROUS SOLUTIONS.

Every Pharmaceutist is familiar with the fact that when a dilute solution of sulphate of quinine is viewed in certain aspects, it exhibits a peculiar celestial blue colour. The phenomenon is of so remarkable a kind, that it has successively occupied the attention of some of the most eminent philosophers of modern times. Passing over Raupp's observations* on the "*blauschillerndes Princip*" of quiniferous solutions, we shall confine our notice to the valuable papers of Sir John Herschel, Sir David Brewster, and Professor Stokes.

In 1845, two papers by Sir John Herschel on this subject were published in the *Philosophical Transactions*. Sir John regarded the colour in question as existing merely on the surface of the solution, and as resulting from the action of the strata which the light first penetrates on entering the liquid, and the dispersion of light produced by it, was termed by him *epipolic dispersion* (from ἐπιπολή, *a surface*). But in order that we may not misrepresent his views, we subjoin the abstracts of his papers published by the Royal Society:—

'Αμόρφωτα, No. 1. "On a case of Superficial Colour presented by a Homogeneous Liquid internally colourless." By Sir John Frederick William Herschel, Bart. F.R.S., &c.

The author observed that a solution of sulphate of quinine in tartaric acid, largely diluted, although perfectly transparent and colourless when held between the eye and the light, or a white object, yet exhibits in certain aspects, and under certain incidences of the light, an extremely vivid and beautiful celestial blue colour, apparently resulting from the action of the strata which the light first penetrates on entering the liquid; and which, if not strictly superficial, at least exert their peculiar power of analyzing the incident rays, and dispersing those producing the observed tint, only through a very small depth within the medium. The thinnest film of the liquid seems quite as effective in producing this superficial colour as a considerable thickness.

'Αμόρφωτα, No. 2. "On the Epipolic Dispersion of Light; being a Supplement to a paper entitled 'On a case of Superficial Colour presented by a Homogeneous Liquid internally colourless.'" By Sir John Frederick William Herschel, Bart., F.R.S., &c.

The author inquires whether the peculiar coloured dispersion of white light intromitted into a solution of sulphate of quinine, is the result of an analysis of the incident light into two distinct species, or merely of a simple subdivision analogous to that which takes place in partial reflection, as exemplified in the colours of thin plates. He endeavours to ascertain the laws which regulate this singular mode of dispersion, which for brevity he terms *epipolic*, on account of the proximity of the seat of dispersion to the intromitting surface of the fluid. It might have been expected that by passing the same incident beam successively through many such dispersive surfaces, the whole of the blue rays would at length be separated from it, and an orange, or red residual beam be left: but the author establishes, by numerous experiments, the general fact, that an *epipolical beam of light*, meaning thereby a beam which has been once transmitted through a quiniferous solution, and undergone its dispersing action, is incapable of further undergoing epipolic dispersion.

There were only two liquids, out of all those examined by the author, namely, oil of turpentine and pyroxylic spirit, which, when interposed in the incident beam, act like the solutions of quinine in preventing the formation of the blue film: and

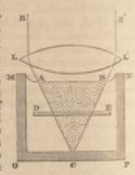
* Buchner's *Repertorium*, Bd. xxxix., p. 465. 1831.

the only solid in which the author discovered a similar power of epipolic dispersion, is the green fluor of Alston Moor, and which by this action exhibits at its surface a fine deep blue colour.

In 1846, Sir D. Brewster* read before the Royal Society of Edinburgh a paper which embraced the consideration of the phenomenon in question. The greater part of his researches, it may be remarked, were made anterior to the publication of Sir John Herschel's papers. In this paper, Sir David shows that the change of colour is not confined, as Sir John Herschel supposed, to the surface of the liquid, but extended to a considerable depth into the body of it, and he was led to regard the phenomenon merely as a particular case of *internal dispersion*. The following extract from his paper will serve to illustrate his views :—

"Sir John has clearly shown, that the light is dispersed outwards as well as laterally ; but as he was conversant only with the phænomena of a narrow blue line, and had not seen the blue cone of rays dispersed from the cone of condensed light, he could not be aware of the changes which take place in its colour while the eye passes from the azimuth of 90° to that of 100°.

These changes are very decided, and will be understood from the figure, in which MNOP is a horizontal section of the vessel containing the solution ; RR' a beam of solar light incident upon an achromatic lens LL, and condensed into the luminous cone ACB. Now, the blue colour produced by the first stratum, next to the side AB, is exceedingly strong, and that which occupies the rest of the cone ACB comparatively faint. When we view the bright blue stratum in the direction NM, or in the azimuth of 90°, the tint is very brilliant, because the eye receives all the blue rays dispersed by the whole length AB of the stratum; whereas, when we view it in direction R'C, in the azimuth of 0°, we only see the tint corresponding to the thickness of the stratum. The tint, however, is, in reality, a maximum in the azimuth of 0°, and gradually diminishes till it ceases in the azimuth of 180°, or in the direction CR'.



The dotted portion of this figure represents the blue space.

If we now immerse in the fluid a plate of colourless glass, whose section is DE, so as to receive the beam ABED, we shall find that there is no peculiar dispersion, as Sir John Herschel observed, either at its surface of incidence or emergence. Hence he concluded that the epipolized beam ABED "is incapable of undergoing further epipolic dispersion ;" and that having thus "lost a property which it originally possessed, it could not therefore be considered *qualitatively* as the same light."

Now, in using a condensed beam of light, as we have done, we find that the whole cone ABC, even when *two* inches long, and with a December sun, disperses the blue light, and the stratum behind the glass plate DE nearly as much as the stratum before it. In fluor-spar and in the other fluids I have mentioned, this is still more strikingly the case,† and hence neither of the conclusions drawn by Sir John Herschel are admissible.

The following appear to me to be the deductions which the experiments actually authorize :—

1. A beam of light which has suffered dispersion by the action of a solid or fluid body (that is, an *epipolized* beam), is capable of further undergoing epipolic dispersion, provided the thickness of the medium is not so great as to have dispersed all the dispersible rays.

* *Edin. Trans.*, vol. xvi., part 2. Also *Lond. Edin. and Dub. Phil. Mag.* for June, 1848.

† In one of these experiments, a piece of green fluor from Alston Moor, when immersed in the quiniferous solution, dispersed a fine *violet blue* light, at the distance of *three-fourths* of an inch from its surface. In another experiment, a beam of light that had been dispersed in the solution of quinine, again suffered dispersion at *two inches* distance from the surface of a piece of Derbyshire fluor.

A beam of light that has passed through the esculine solution disperses blue light, but not copiously, when transmitted through the quinine solution, but the beam that has passed through quinine is copiously dispersed when transmitted through esculine.

2. When such a medium is thus rendered incapable of dispersing more light, it is not because it has lost a property which it originally possessed, but because it is deprived of all the dispersible rays which it contained.

It is no doubt an interesting fact, that a small number of differently coloured rays, constituting blue light by their mixture, should possess this property of being dispersed, while other rays of the same refrangibility are either less dispersible, or apparently indispersible, by the same medium ; but the fact will appear less surprising and anomalous when we advert to certain phenomena of absorption in which the same property is displayed.

The difference between the *absorption* and the *internal dispersion* of light is simply this. In the one case the portion of light withdrawn from the intromitted beam is *extinguished* and *invisible*, and in the other *dispersed* and *visible* ; and we may compare the two classes of phenomena, by *supposing* that the light extinguished by absorption is rendered visible as if by dispersion. Now it is a remarkable fact, that almost the whole of the blue light absorbed by the mineral called *native orpiment*, is extinguished during the passage of the light through the first stratum, whose thickness is less than the fiftieth of an inch ; and hence it is that the thinnest slice of this substance has nearly as deep a yellow colour as the thickest. Were the absorbed blue rays to become visible by dispersion, we should actually see a more striking example of epipolism, or dispersion confined to the first stratum, than in the quiniferous solution. Even the condensation of the beam would not in this case give us a blue cone of light.

Professor Stokes has recently had his attention drawn to the subject, and in a paper sent to the Royal Society in May, 1852, and entitled, "On the Change of Refrangibility of Light," has entered into a most elaborate examination of this most interesting phenomenon, which he proposes to call "*fluorescence*." In speculating upon the possible nature of the epipolized light, he was led to the conclusion that it could only be light deprived of certain invisible rays, which, in the process of internal dispersion had changed their refrangibility, and had thereby become visible. In other words, the chemical rays of the spectrum, which are more refrangible than the violet, and invisible in themselves, produce the blue superficial light in the quiniferous solution.

"Startling as such a supposition might appear at first sight, the ease with which it accounted for the whole phenomenon was such as already to produce a strong probability of its truth. Accordingly the author determined to put this hypothesis to the test of experiment.

"The experiments soon placed the fact of a change of refrangibility beyond all doubt. It would exceed the limits of an abstract like the present to describe the various experiments. It will be sufficient to mention some of the more remarkable results.

"A pure spectrum from sunlight having been formed in air in the usual manner, a glass vessel containing a weak solution of sulphate of quinine was placed in it. The rays belonging to the greater part of the visible spectrum passed freely through the fluid, just as if it had been water, being merely reflected here and there from motes. But from a point about half-way between the fixed lines G and H to far beyond the extreme violet the incident rays gave rise to light of a sky-blue colour, which emanated in all directions from the portion of the fluid which was under the influence of the incident rays. The anterior surface of the blue space coincided of course with the inner surface of the vessel in which the fluid was contained. The posterior surface marked the distance to which the incident rays were able to penetrate before they were absorbed. This distance was at first considerable, greater than the diameter of the vessel, but it decreased with great rapidity as the refrangibility of the incident rays increased, so that from a little beyond the extreme violet to the end the blue space was reduced to an excessively thin stratum adjacent to the surface by which the incident rays entered. It appears, therefore, that this fluid, which is so transparent with respect to nearly the whole of the visible rays, is of an inky blackness with respect to the invisible rays more refrangible than the extreme violet. The fixed lines belonging to the violet and the invisible region beyond were beautifully represented by dark places interrupting the blue space. When the eye was properly placed, these places were of course projected into lines. The author has made a

sketch of these fixed lines, which accompanies the paper. They may be readily identified with the fixed lines represented in M. Becquerel's map of the fixed lines of the chemical spectrum. The last line seen in a solution of sulphate of quinine appears to be the line next beyond the last represented in M. Becquerel's map. Under very favourable circumstances two dusky bands were seen still further on. Several circumstances led the author to conclude that in all probability fixed lines might be readily seen corresponding to still more refrangible rays, were it not for the opacity of glass with respect to those rays of very high refrangibility.

"It is very easy to prove experimentally that the blue dispersed light corresponding to any particular part of the incident spectrum is not homogeneous light, having a refrangibility equal to that of the incident rays, and rendered visible in consequence of its complete isolation, but that it is in fact heterogeneous light, consisting of rays extending over a wide range of refrangibility, and not passing beyond the limits of refrangibility of the spectrum visible under ordinary circumstances. To show this it is sufficient to isolate a part of the incident spectrum, and view the narrow beam of dispersed light which it produces through a prism held to the eye.

"In Sir David Brewster's mode of observation, the beam of light which was of the same nature as the blue light exhibited by a solution of sulphate of quinine, was necessarily mixed with the beam due merely to reflection from suspended particles; and in the case of vegetable solutions, a beam of the latter kind almost always exists, to a greater or less degree. But in the method of observation employed by the author, to which he was led by the discovery of the change of refrangibility, the two beams are exhibited quite distinct from one another. The author proposes to call the two kinds of internal dispersion just mentioned *true internal dispersion* and *false internal dispersion*, the latter being nothing more than the scattering of light which is produced by suspended particles, and having, as is now perfectly plain, nothing to do with the remarkable phenomenon of true internal dispersion.

"Now that the nature of the latter phenomenon is better known, it is of course possible to employ methods of observation by which it may be detected even when only feebly exhibited. It proves to be almost universal in vegetable solutions, that is, in solutions made directly from various parts of vegetables. When vegetable products are obtained in a state of isolation; their solutions sometimes exhibit the phenomenon and sometimes do not, or at least exhibit it so feebly that it is impossible to say whether what they do show may not be due to some impurity. Among fluids which exhibit the phenomenon in a high degree, or according to the author's expression are highly *sensitive*, may be mentioned a weak decoction of the bark of the horse-chestnut, an alcoholic extract from the seeds of the *Datura Stramonium*, weak tincture of turmeric, and a decoction of madder in a solution of alum. In these cases the general character of the dispersion resembles that exhibited by a solution of sulphate of quinine, but the tint of the dispersed light, and the part of the spectrum at which the dispersion begins, are different in different cases. In the last fluid, for example, the dispersion commences somewhere about the fixed line D, and continues from thence onwards far beyond the extreme violet. The dispersed light is yellow, or yellowish orange.

"In the case of other fluids, however, some of them sensitive in a very high degree, the mode in which light is dispersed internally presents some very remarkable peculiarities. One of the most singular examples occurs in the case of an alcoholic solution of the green colouring matter of leaves. This fluid disperses a rich red light. The dispersion commences abruptly about the fixed line B, and continues from thence onwards throughout the visible spectrum and a little beyond. The dispersion is subject to fluctuations intimately connected with the singular absorption bands exhibited by this medium."

ON THE QUANTITY OF ALKALOIDS CONTAINED IN MANY CINCHONA BARKS.

BY DR. E. RIEGEL.

RIEGEL, of Carlsruhe, has tested many cinchona barks for the purpose of determining their proportion of alkaloid, and obtained results differing according to the method employed. The following are those which he obtained by the method of Buchner (*Pharmaceutical Journal*, vol. xi., p. 164), and that of Rabourdin (*Pharmaceutical Journal*, vol. x., p. 470). The classification of the barks is that of Weddell.

I. *Grey Barks—a. Loxa barks.*

1. Loxa bark, grey and dense, from Cinchona Condaminea.
2. " " brown and dense (dark Jaen bark, or China-Pseudo-Loxa), from C. scrobiculata.
3. " " red-chestnut-brown (pale calisaya), from C. scrobiculata.
4. " " red, fibrous of the King of Spain. Origin?
5. " " yellow and fibrous, from C. macrocalix, Pav.

b. Lima, or Huanuco Barks.

1. Lima bark, greyish-brown (Cascarilla provinciana S.) from C. micrantha R. et P. or C. lanceolata R. et P.
2. " " common grey, from C. micrantha or lanceolata R. et P.
3. " " white, from C. purpurea R. et P.
4. " " very wrinkled, similar to calisaya bark, from C. glandulifera.
5. Jaen-bark, or Loxa-bark, red. Origin?

II. *Red Barks.*

1. Red bark, becoming white in the air. Origin?
2. " " from Lima, from C. nitida R. et P.
3. " " genuine, and not warty, from C. nitida.
4. " " officinal, from C. nitida.
5. " " genuine and warty, from C. nitida.
6. " " orange-coloured and warty. Origin?
7. " " pale, with white epidermis. Origin?
8. Carthagena bark, brown.
9. " " red.

III. *Yellow Barks.*

1. Yellow bark of the King of Spain, from C. Calisaya.
2. Calisaya bark, China regia, from C. Calisaya.
3. Orange-yellow bark, light calisaya, from C. micrantha.
4. Pitaya bark (quinquina de Columbia, Guib.) from C. Condaminea.
5. Carthagena bark, ligneous, from C. Condaminea.
6. Orange bark of Mutis, from C. lancifolia.
7. China Huamalies, dark grey, from C. hirsuta.
8. " " thin, reddish, from C. purpurea.
9. " " white. Origin?
10. " " rust-coloured, from C. micrantha.
11. Yellow bark from Cuenza, from C. ovalifolia.

IV. *White Barks.*

1. Pale Jaen bark, from C. ovata.
2. Pale grey Jaen bark, from C. ovata.
3. White Loxa bark, from C. ovata.
4. White fibrous Jaen bark, from C. ovata.
5. Cusco bark, from C. pubescens or cordifolia.
6. Arica bark, from C. pubescens or cordifolia.
7. China flava dura, from C. pubescens or cordifolia.
8. China flava fibrosa, from C. pubescens or cordifolia.
9. Pitayon, or spurious Pitaya bark. Origin?

Results according to the Methods of Buchner and Rabourdin.

1. One ounce of calisaya bark, best quality, yielded 18.25 grains quinine, or 3.8 per cent.—*Rabourdin.*
One ounce of the same bark, the product having been purified, 15.5 grains quinine, or 3.22 per cent.—*Buchner.*
2. One ounce calisaya bark, Wed. var. β Josephiana, 15.75 grains, or 3.29 per cent.—*Rabourdin.*
One ounce of the same bark, 13.25 grains, or 2.76 per cent.—*Buchner.*
3. One ounce calisaya bark, middling quality, 12 grains, or 2.5 per cent.—*Rabourdin.*
One ounce calisaya bark, 10.5 grains, or 2.18 per cent.—*Buchner.*

4. One ounce false calisaya, from C. pubescens, Wed., 8.2 grains, or 1.7 per cent.—*Rabourdin.*

5. One ounce fibrous yellow bark yielded 10 grains alkaloid, or 2.08 per cent.—*Rabourdin*; 9.5 grains alkaloid, or 1.97 per cent.—*Buchner.*

By treating the alkaloid with ether, almost half of it was dissolved, and the residue, obtained after evaporating this solution, possessed the properties of the quinine, hereafter to be described, and that portion which had remained undissolved, those of cinchonine. Whether the quinine contained cinchotine, could not be determined. Buchner gives it as his opinion, that the Carthagena bark contains no quinine, but cinchotine and cinchonine.

6. One ounce of hard yellow bark (flava dura) yielded 11.5 grains, or 2.39 per cent. alkaloid after *Rabourdin*; 11.2 grains, or 2.3 per cent. after *Buchner*. On the application of ether about 5 grains were dissolved of 11.5 grains, showing a proportion of 1.04 per cent. quinine and 1.35 per cent. cinchonine, which quantities and proportions agree pretty nearly with the experiments of Geiger, Röttger, Bonnet, Scharlau, and others.

7. One ounce red bark, best quality, yielded 20 grains, or 4.16 per cent. after *Rabourdin*; 18.75 grains, or 3.9 per cent. after *Buchner*. Of these 20 grains, 12.75 grains were dissolved by ether, which corresponds with 2.65 per cent. quinine, and 1.51 per cent. cinchonine.

8. One ounce of red bark, in large, broad flat pieces, contained 18.5 grains, or 3.85 per cent.—*Rabourdin.*

The results hitherto obtained with regard to this bark differ considerably from one another, and especially in the relative proportions of quinine and cinchonine. Michaelis found in 100 parts 0.42 cinchonine and 0.83 quinine; Von Santen, on the other hand, at an average, a much larger proportion of cinchonine than of quinine, whilst Pelletier and Caventou obtained from quilled bark 0.8 cinchonine and 1.7 quinine. According to the table of the proportions of the alkaloid, quoted in Duk's *Commentary on the Prussian Pharmacopœia*, one pound of red bark (thick middling heavy quills) contains 197 grains alkaloid: 184 grains cinchonine, and 9 grains sulphate of quinine; one pound of fine quills of fresh appearance, 147 grains alkaloid: 70 grains cinchonine, and 77 grains sulphate-of quinine; one pound of large, broad and flat pieces of a fresh brown-red appearance, 105 grains alkaloid: 90 grains cinchonine, and 15 grains sulphate of quinine. In more than thirty experiments performed by Röttger, Bonnet, and others, the proportion of quinine (calculated as sulphate of quinine) has always proved to be larger than that of cinchonine. Scharlau obtained after Stratingh's method, in an average of three experiments, 1.34 per cent. quinine and 1.11 per cent. cinchonine.

After Tilloy	0.96	per cent.	quinine and	0.6	per cent. cinchonine.
" Stoltze	1.45	"	"	0.06	" "
" Veltmann	1.40	"	"	1.00	" "

9. One ounce false red bark (origin?) yielded, after *Rabourdin*, six grains, or 1.25 per cent. alkaloid, of which 2.5 grains dissolved in ether, equal 0.52 per cent. quinine, 0.73 per cent. cinchonine.

10. One ounce Cinch. *regia rubiginosa* (origin?) contained, after *Rabourdin*, 14.75 cinchonine, with a trace of quinine, or 2.87 per cent.; Franck found in 100lbs. of the bark 50 ounces, or 3.12 per cent. cinchonine, with a trace of quinine. The Ch. rubiginosa bearing great resemblance to Ch. flava fibrosa (it was first introduced into commerce under the false name of *cusco bark*, from which it differs, however, strikingly), it may be supposed that this bark originates from some species which is closely related to cinchona pubescens, perhaps even from that very same.

11. One ounce Huanuco bark in heavy middling quills, contained, after *Rabourdin*, 11.7 grains pure cinchonine; after *Buchner* 11.75 grains, equal to 2.4 per cent. Winckler obtained 2.473 per cent.; Buchner only 1.875 per cent. of coloured alkaloid; and Röttger, after the improved method of Veltmann, 2.8. per cent.

12. One ounce Huanuco bark in thick quills yielded nine grains, or 1.87 per cent. cinchonine.—*Rabourdin.*

13. From one ounce of Loxa bark, the so-called finest crown bark, 4.5 grains, or 0.94 per cent. alkaloid were obtained after *Rabourdin*, of which 2.5 grains dissolved in ether, showing the properties of quinine, whilst the residue manifested itself as cinchonine.

14. One ounce of ordinary Loxa bark, in beautiful middling quills, contained 3.5 grains, or 0.73 per cent. alkaloid, consisting for the greatest part of cinchonine.—*Rabourdin.*

15. One ounce Ch. Huamalies in fine and middling fine quills and somewhat flat pieces, contained 7 grains, or 1.46 per cent, cinchonine.—*Rabourdin*; 6.5 gr.—*Buchner.*

16. One ounce Ch. Huamalies in thick warty quills and flat pieces yielded, after *Rabourdin*, 4.25 grains, or 0.93 per cent. cinchonine. Winckler found in the best Huamalies 1.15 per cent. alkaloid, quinine, and cinchonine. Buchner discovered only cinchonine in this bark. Hornemann extracted from 1lb. Crown Huamalies 132 grains cinchonine and four grains quinine; from the so-called grey Huamalies 128 grains cinchonine and hardly any quinine. The average of both experiments gives 1.7. per cent. alkaloid.

17. One ounce of pale ash bark (Jaen China) yielded, after *Rabourdin*, 2.5 grains, or 0.51 per cent. alkaloid, containing only traces of quinine. From the dark Jaen China, or pseudo Loxa, Winckler extracted 2.844 grains cinchonine and 0.711 grains quinine, together 3.5 grains, or 0.045 per cent. alkaloid; afterwards he described a bark Jaen fusca (synonym China rubra de Janeiro?) which is said to contain neither quinine, nor cinchonine, nor kinovic acid, but the cinchovatin of Manzini. According to the most recent investigations of Winckler (*Neues Repert. f. d. Pharm.*, Bd. i., Hft. 1.) the pale Jaen bark does not contain quinine, as has been hitherto supposed; but Paracin, which exists also in the dark Jaen or Para bark, combined with a substance resembling red cinchonic. The latter bark contains also kinate of lime (of the presence of which the author has convinced himself), but no kinovic acid. For the preparation of paracin Winckler recommends the application of muriatic acid to the alcoholic extract and precipitating with carbonate of soda. The paracin has much resemblance to bebeerine. The author doubts whether these statements of Winckler agree with the data of Weddell respecting the origin of the barks.

18. One ounce of cusco bark yielded, after *Rabourdin*, 5.25 grains alkaloid, which in a pure state has the greatest resemblance to paracin.

19. China nova surinamensis treated after the same method yielded no alkaloid, but kinic acid, kinovic acid, and cincho-tannic acid.

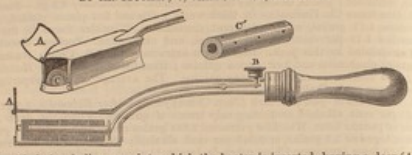
20. One ounce Pitaya, Tocamez, or Acatemez bark contained 8 grains alkaloid, after *Rabourdin*, for the greatest part insoluble in ether, and possessing the properties of cinchonine. Peretti discovered in this bark (recommended by Brera as Ch. bicolorata) a peculiar vegetable basic salt called *Pitoyin*; Muratori, however, obtained from 12 ounces 17 grains quinine, 80 grains cinchonine, 18 grains of a peculiar substance, 3 drachms 24 grains tannin, 9 drachms red cinchonic, soluble in alcohol, 36 grains soluble in acids, and 24 drachms soluble in alkalies, 1 drachm 8 grains Kinate of lime and free kinic acid, 7 drachms of gum, and 6 ounces 1 drachm 21 grains ligneous fibres. The origin of this bark is yet unknown; to judge from the presence of quinine and cinchonine it may be derived, according to Weddell's views, from a species of Cinchona, although some suppose it to come from Exostemma floribundum. Equally unknown is the origin of the bark of Maracaibo; Winckler found in it kinovate of quinidine, a peculiar yellow colouring matter, which does not change the chloride of iron, a large proportion of kinate of lime, very little cincho-tannic, and no red cinchonic.—*Pharm. Central-Blatt*, July, 1852, No. xxxii., p. 508.

HOSPITAL SULPHATE OF QUININE.

Mr. Edward Herring has introduced a preparation under this name, consisting of disulphate of quinine only partially purified. In its medicinal properties it is said to differ but little from the ordinary disulphate. It has a brownish colour, and is of course not admissible as a substitute for disulphate of quinine in general dispensing, but it has been tried in hospitals and dispensaries, and by some medical men who dispense their own medicines. The preparation is recommended on account of its economy. The final purification and decolorization of the salt being attended with some expense, the manufacturer is enabled to offer it in a partially purified state at a considerable reduction from the price at which it can be sold when purified in the usual way. The amount of impurity must be ascertained before its real value can be estimated. It may be a question whether the recognition of a preparation so imperfectly purified might not open the door to some abuse.

PATENT HEAT-REGULATING PLASTER SPATULA.

BY MR. STOCKEN, 3, GRAY'S PLACE, BROMPTON.



The blade is a hollow case into which the heater is inserted, having a door (A) at one end, and being connected at the other by a hollow tube, with the handle. The heater (C) is supported on a lever, which passes through the hollow tube and terminates in a thumb-button (B). By depressing this button, the heater is raised so as not to be in contact with the lower part of the spatula. On removing the thumb when more heat is required, the heater is depressed, and produces the desired effect. The heater, which consists of a hollow tube of thick copper, slides on a pin, which forms the termination of the lever, and which regulates its position in the box. Some heaters are perforated to admit of their being easily heated by means of gas.

The chief advantage of this spatula consists in the facility with which the heat may be regulated by means of the lever and button, which latter is quite under the control of the thumb. The box containing the heater is composed of brass, and not being inserted in the fire, is less troublesome to keep clean than the common spatula. When several plasters are required, the heater may be removed and another inserted with facility, without loss of time.

FELT AND CHAMOIS LEATHER PLASTERS.

Messrs. Wright and Ewing have introduced a material which is likely to be valuable to patients requiring plasters for bed sores. It may also be useful for other purposes. It consists of a kind of felt, more soft in its texture than that which is used for hats, and is covered on one or both sides with chamois leather. The plaster is either spread on the leather or on the felt. In either case, it appears to be an application likely to prove serviceable. It may be used for removing pressure from any particular spot, by cutting a hole in the plaster at the part affected.

SPECIMEN BOTTLE FOR CHEMICAL PREPARATIONS.

This bottle, which is made by Mr. Gilbertson, is a great improvement on those generally used for exhibiting small chemical specimens in museums. The bottle is inverted and mushroom-shaped, the stopper being attached to the stem and foot. The cut sufficiently represents it without further description.

WHAT IS THE STRENGTH OF BATTLEY'S LIQUOR OPII. SEDATIVUS?

BY MR. WILKINSON.

The question in the Journal for this month, "What is the true strength of Battley's solution of opium?" induced me to institute some experiments with a view of ascertaining its actual strength, and also of furnishing a means whereby the strength of other secret preparations of opium (not professing to be solutions of its salts) might be estimated. Believing that the real strength of these solutions is not to be deduced solely from the amount of dry extract they contain, but rather from the quantity of powdered opium represented by that extract, I endeavoured to ascertain the relation between the two, in order to furnish a standard whereby to estimate the quantity of powdered opium to which the dry extract obtained from a definite quantity of the solution would be equivalent. To do this it was necessary first to ascertain the quantity per cent. of dry extract yielded respectively to water and to proof spirit by the same sample of opium.

My mode of proceeding was as follows:—A sample of Turkey opium was selected, of which 1000 grains were treated with successive portions of cold water, until all the soluble matter was taken up: the solutions were mixed, filtered, and slowly evaporated, until a dry pulverizable extract remained, which weighed 550 grains. 1000 grains of the same sample were dried and powdered (the loss in drying was 13 per cent.), the powder treated with proof spirit until exhausted, and the dry extract obtained was 589 grains.

Now it appears from the table* in Mr. Redwood's paper on "Drug Grinding," that the average loss in powdering opium is 13.28 per cent., and as that on which I operated lost in drying 13 per cent., I think it may be fairly taken as representing pretty correctly the average of commercial Turkey opium, and in my calculations I have assumed it to be so.

We see then that the dry extract obtained by cold water from crude opium is 55 per cent., which is equivalent to 63.2 per cent. from powdered opium, and the quantity yielded to proof spirit by powdered opium is 67.7 per cent. These data, I think, supply the means of forming a tolerably close approximation to the true strength of Battley's and other solutions of opium.

To apply this principle, I obtained by slow evaporation from fl. ℥ij. Battley's Liq. Opii. Sed. 5.4 grs. of dry extract, and assuming it to be an aqueous solution of opium (for which we have the authority of Mr. Battley himself, as quoted by Dr. Pereira†), it will be seen from the above data that this is equivalent to 8.55 grs. powdered opium, and, consequently, twenty minims of the solution contain .9 grs. of the dry extract, and are equivalent to 1.42 grs. powdered opium, which is very nearly the strength of Tinct. Opii., P. L.; as I find that that tincture, very carefully prepared according to the directions in P. L., 1851, contains exactly 1.02 grs. of dry extract in 20 minims, which calculated on the same principle is (omitting the decimal) equivalent to 1¼ grs. powdered opium.

These results show the real strength of Battley's solution of opium to be the same, or very nearly the same, as that of tinctura opii., P.L., and further, that in estimating the strength of liquid preparations of opium in comparison with powdered opium, it is necessary to take into account the insoluble portion of the latter, which amounts to about one-third of its weight.

38, *Gartside Street, Manchester,*
October 19th, 1852.

* *Pharmaceutical Journal*, vol. viii., page 227.
† *Materia Medica*, second edition, vol. ii., page 1772.

AN EXTREME DOSE OF LAUDANUM.—A VILLAGE DOCTOR.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—I was reading to-day your article on Toxicology, and noticed the paragraph where Dr. Christison mentions a person as taking nine ounces of tincture of opium daily. I have a customer, a woman, at this present time who purchases and takes on an average from eight to ten ounces of laudanum (full strength) daily, and has done so these two years past.

A laughable instance of the ignorance of some persons prescribing and selling medicines, is a case which occurred in my shop a few days ago. A "Village *Doctor*" came and asked for 4 oz. "mercury ointment," 1 oz. "niter," and requested me to mix them for him. I asked him what he wanted such a curious mixture for; he said it was for sores, boils, and eruptions, and such like complaints. He called it "niterated ointment of mercury." Undoubtedly it was *niterated* with a vengeance. All my explanations as to the nature Ung. Hyd. Nit. could not convince him he was wrong; it was the way he always made "niterated ointment of mercury, and always should." Only fancy *rubbing in* Ung. Hyd. Fortius and saltpetre to sores, boils, and *such like* complaints!

I am, Sir, yours respectfully,

P. WOODCOCK.

295, *High Street, Lincoln, Oct. 11th*, 1852.

NOTE ON THE COMMERCIAL ANALYSIS OF THE CYANIDE OF POTASSIUM.

BY M. J. FORDOS AND A. GELIS.

THE cyanide of potassium, as manufactured for industrial purposes, is an extremely impure substance, containing scarcely half its weight of the actual cyanide. Its form, which is that of a melted mass, exposes it, more than any other substance, to adulteration; and yet nothing has been done by Chemists with the view of discovering the means of readily ascertaining its commercial value.

Nevertheless the industrial importance of cyanide of potassium is becoming greater every day, and the extent of its consumption for galvano-plastic and photographic purposes is already sufficiently important to render this omission of Chemists a matter of regret. For this reason we have sought to repair it.

The analytical process which we propose, but into the details of which we cannot enter here, is founded upon the action exercised upon cyanide of potassium by iodine. These two bodies combine rapidly with one another, every equivalent of cyanide of potassium absorbing exactly two equivalents of iodine.

The nature of the products thus formed is perfectly well known, and the reaction, which is represented by the formula—CyK+2I=IK+ICy, has been studied by Serullas and Wöhler. The two components of the cyanide of potassium divide the iodine exactly between them, and the result is one equivalent of iodide of potassium and one equivalent of iodide of cyanogen.

Knowing the reaction, it remained for us to determine the conditions under which it ought to be produced for the purpose proposed, and to indicate the precautions required in the operation: this we have done in our detailed memoir.

It was necessary also to guard against the action which might be exercised upon the iodine by the foreign substances which are found in commercial cyanides, and which have been added to it by design. We attained this result by the employment of Selzer-water in our analysis; the carbonic acid contained in it change the caustic alkalies and the carbonate of potash into compound bicarbonates, which do not absorb iodine.

We have made numerous trials of this process, and we have succeeded, by means of the indications which they have furnished us, in modifying the processes hitherto employed in the preparation of cyanide of potassium, and which could only give impure results.—*Comptes Rendus*, Aug., 1852, p. 224.

ON THE BOUQUET OF WINE.

BY DR. F. L. WINCKLER.

In his recent experiments on the vegetation of plants, Winckler has arrived at very satisfactory results explanatory of the specific odour peculiar to the various sorts of wine produced in different districts, which is known by the expression of "*bloom*," or "*bouquet*."

If about half-a-pint of any sort of grape-wine be evaporated in a porcelain vessel by means of steam, until not only all the spirit of wine, but also the œnanthic ether, and in general all parts volatile at this temperature (80° R.) are evaporated, a thickish liquid of more or less dark colour, and of a peculiar, pleasant, acidulo-vinous odour remains behind, from which, after it has become cold, a greater or lesser quantity of tartar separates. By diluting this liquid with water, so that the weight of the solution is about a quarter of a pound, and subjecting the solution with an equal weight of fresh burnt lime to distillation, there is obtained even during the slacking or hydrating of the lime a very agreeable and intensely smelling distillate, which, like ammonia, is a strong base, and forms with acids neutral salts, possessing in a high degree the odour corresponding to the so-called "bouquet" of the employed wine.

This fact suggested the idea that this compound may be in a similar manner contained in the wine itself, and the supposition was fully corroborated by experiments.

If the residuary lime of the evaporated wine be treated with water after the conclusion of the distillation, the solution filtered, and the filtrate distilled with a small quantity of moderately strong sulphuric acid, a new volatile acid of a highly specific, almost balsamic odour is obtained, which being neutralized by the necessary quantity of the first obtained nitrogenous base, yields a neutral volatile salt, which possesses the peculiar odour ("bouquet") of the employed wine in the highest degree. There is, therefore, no doubt that this compound is not only contained as such in the wine, and constitutes the "bouquet," but that it is this nitrogenous compound which determines the chemical constitution, the durability, and all those changes to which it is subject by keeping.

Although for the present only six different sorts of red and white grape-wine from various districts of the Grand Duchy have been examined, yet the results are so uniform and decisive, that there exists no reason to doubt their correctness. The contrast was very striking on comparing the "bouquets" of a fine red Oberingelheim wine of 1846 with a very excellent sort of white Bergstraszer of 1846, and with one of the worst qualities of 1851 from the latter district. The two first sorts yielded quite a different bouquet of a very pleasant odour, whilst the latter betrayed but too distinctly the year and quality by its unpleasant earthy smell.

Beer also contains a considerable proportion of nitrogen, which can be obtained from it in the same way as from the wine. It is this component from which beer obtains its importance as a nutrient.

The author has, moreover, found, that the colouring matter of wine, and chiefly that of red wine, is closely connected with this nitrogenous compound; that most, and perhaps all, fresh vegetable juices contain nitrogen, and undergo during the process of vegetation changes which are analogous to the fermentation of wine; that the fragrancy of the vine flowers, and very likely also the odours of most flowers and leaves are dependent on similar compounds, which are characteristic, and of a peculiar chemical composition in each genus of plants.—*Jahrbuch f. pract. Pharmacie*, Bd. XXV., Hft. 1, p. 7.

ON LITMUS.

BY DR. J. MÜLLER, APOTHECARY AT BERLIN.

ACCORDING to Dr. Müller, the inferior sorts only of litmus contain a mechanical admixture of indigo. Whilst moist, the litmus is introduced into a swing-machine [*Schwungmaschine*] containing finely powdered indigo, and worked until it has assumed an uniform colour. But neither Prussian blue nor cobalt is employed.

In the manufacture of litmus all kinds of lichens, even indigenous sorts, are employed; but the best quality is prepared in Holland exclusively from Roccella

tinctoria. Inferior sorts, however, are made from species of Variolaria, Lecanora, and Parmelia. These are finely ground, and placed in contact with nitrogenous substances, especially urine, at a certain temperature. The first product is a red colouring matter, which is formed slowly, if sufficient attention be not paid to the process, and equally high temperature maintained. As soon as this stage has been attained some potashes are added, not American, Russian, or Illyrian, but a German sort, which contains a peculiar constituent, and cannot be manufactured in Holland. Upon this constituent, and the addition of Carrara marble, rests chiefly the secret of obtaining a good litmus.—*Archiv. de Pharm.*, 2te Reihe, Bd. lxx., H. 3, p. 287.

BLACKING.

The following description of the essential conditions for the production of good blacking is given in the "Reports of the Juries" of the Great Exhibition.

Blacking consists essentially of two principal components, namely, a black colouring-matter and certain substances which will acquire a gloss by friction. Each maker has, of course, proportions and methods of mixing peculiar to himself, but the chief materials used are the same in most cases. In England they generally consists of bone-black, sugar or molasses, sperm-oil, sulphuric acid, and strong vinegar. These, according to Mr. W. C. Day, are mixed in the following order:—The bone-black, in the state of a very fine powder, and the sperm-oil are first thoroughly incorporated; the sugar or molasses, mixed with a small proportion of vinegar, is now added and well stirred with the mass; strong sulphuric acid is then gradually poured into the vessel. Much heat is generated at this stage of the process, and an effervescence ensues, owing to the action of the acid on the carbonate of lime contained in the bone-black. The object of the sulphuric acid, which should not be in excess, is to cause the decomposition of the tri-basic phosphate and the carbonate of lime contained in the bone-black, so as to produce on the one hand sulphate of lime, and on the other a soluble acid phosphate. Sulphate of lime, when produced under such circumstances, gives rise to a very tenaceous paste, by mixing with the finely divided carbonaceous matter of bone-black disintegrated by the same reaction, which paste or cake is capable, when spread out, of assuming a very smooth surface. To this the sugar and the oil impart the property not only of adhering to the leather, but also of taking a high degree of lustre under the frictional or burnishing action of the brush. The oil is, moreover, very useful in rendering the leather pliable.

The mixture, after the action of the acid has ceased, is diluted with an additional quantity of vinegar, and is bottled whilst it is still warm. By bottling the liquid in this state, and corking and sealing it immediately, a rarefied space is formed; and there is no liability afterwards that the blacking, if it wet the cork, will exude by the expansion of the air contained in the bottle, as it is not likely to become again heated to the same temperature under the influence of any climate to which it may be subjected. The vinegar employed should not be too weak, otherwise the blacking will not keep.

Paste blacking is now made in precisely the same way as liquid blacking, excepting that the last portion of vinegar is not added. The employment of such blacking appears to have preceded that of liquid blacking. It was usually stuck on to a small shovel-shaped board, having a very short handle; and it was wetted with water or saliva, as required. The old cake blacking differed in composition from that of the present day, and appears to have contained lamp-black, treacle, and oil.

GERMAN BLACKING.

According to the information which Baron Liebig has kindly furnished to the reporters, it appears that in Germany blacking is made in the following manner:—Powdered bone-black is mixed with half its weight of molasses and one-eighth of its weight of olive-oil, to which are afterwards added one-eighth of its weight of hydrochloric acid, and one-fourth of its weight of strong sulphuric acid. The whole is then mixed up with water to a sort of unctuous paste.

THE LATE PROHIBITION OF THE SALE OF COFFEE MIXED WITH ANY OTHER INGREDIENT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

My dear Sir,—Having been accustomed to manufacture "Essence of Coffee" for some time, and as chicory and sugar both enter into the composition of this preparation, I was repeatedly asked whether the new Government Act would interfere with the sale of the essence, when it promised to be so stringent in the regulations attending the sale of ground coffee. As no one in this neighbourhood could give me a satisfactory reply to the query, whether parties selling essence of coffee were liable to be prosecuted for infringing the Treasury Order about to come into operation regarding the sale of coffee, I was induced to write direct to the Commissioners of the Inland Revenue, and the following is a copy of the communication:—

"*To the Commissioners of the Inland Revenue.*

"Gentlemen,—I have for some time manufactured '*Essence of Coffee*,' containing a certain proportion of chicory, and for my future guidance in the preparation of this Essence I will feel obliged by your informing me whether *Essence of Coffee* so prepared will come under the operation of the recent Government enactment regarding the sale of pure and unmixed coffee.

"I remain your obedient Servant,
(Signed) "John Mackay.

"*Edinburgh*, 121, *George Street*, 12*th Oct.*, 1852."

In answer to this a letter was received in a few days, of which the following is a copy:—

"*Inland Revenue Office, Old Broad Street, London,*
"*Oct.* 16*th*, 1852.

"Mr. Mackay,

"Sir,—In reply to your letter of the 12th instant, I am directed by the Commissioners to acquaint you that you will undoubtedly be liable to prosecution if you mix chicory or any other ingredient with coffee in any form.

"I am, Sir, your obedient Servant,
(Signed) "Thos. Dobson, *Assist. Secretary.*"

This reply being of such a sweeping nature, I could not otherwise view it than as a declaration that from henceforth no Essence of Coffee would be permitted to be sold. To put, however, the whole affair at rest, I wrote again to the Commissioners, as follows:—

"*To the Commissioners of the Inland Revenue, London.*

"Gentlemen,—I am in receipt of your communication of the 16th instant. From the contents, am I right in concluding that no preparation from coffee can henceforth be sold excepting the *whole* and *ground* bean? In other words, will I, for the future, be prevented making an Essence of Coffee with coffee and sugar alone? If I am thus prevented, will I be permitted to make '*Essence*' at all, supposing it possible that a suitable article could be prepared with water only? An early reply to the above will be esteemed a favour by your obedient Servant,
(Signed) "John Mackay.

"*Edinburgh*, 121, *George Street*, 18*th Oct.*, 1852."

To this the following answer was received:—

"*Inland Revenue Office, Old Broad Street, London,*
"22*nd Oct.*, 1852.

"Mr. John Mackay, 121, *George Street, Edinburgh.*

"Sir,—In reply to your further letter of the 18th instant, I am directed to acquaint you that no article whatever can be mixed with coffee for sale.

"I am, Sir, your obedient Servant,
(Signed) "Geo. Ballard."

This ends the correspondence, and it would appear, that on and after the 3rd of November, any one vending Essence of Coffee will be liable to prosecution.

As I think the sooner all interested in this subject are made aware of the state of the law the better, I will not here inquire into the merits or demerits of the late

enactment for the sale of pure coffee, but as the Excise authorities are not very agreeable parties with whom to be at variance, every caution should be exercised in not opposing the spirit and meaning of the Act. Permission may yet be granted to manufacture an essence from coffee under certain restrictions, but until this be obtained and sanctioned, parties must be careful as to the manner in which they dispose of essence of coffee. It must not be forgotten that the tea licence, which most respectable Druggists pay to enable them to sell spices, comprehends coffee, and thus brings these individuals under the eye of the law as "licensed dealers."

The statement now made may, I hope, be the means of eliciting further information on the subject, and I may in concluding, mention that a respectable firm in this town who do a very large trade in Essence of Coffee, have, since the beginning of this correspondence, sent a memorial to the Lords of the Treasury on this subject, which I trust may be attended with some good result.

I remain, yours very truly,

Edinburgh, 121, *George Street*, 23*rd Oct.*, 1852. JOHN MACKAY.

IMPROVEMENTS IN OBTAINING AMMONIACAL SALTS.

(*Newton's Patent, enrolled Aug.* 23.)

IN the process of manufacturing coke by means of the ordinary coke ovens, the ammoniacal gases generated have hitherto been allowed to escape and become lost. The object of the present invention is to prevent the loss of this ammonia, by conducting or drawing off the gases and vapours which are given off in the manufacture of coke, by means of a blowing apparatus into a flue containing suitable contrivances for condensing them, after which the condensed products are brought into contact with finely divided streams of sulphuric acid or other suitable liquid capable of taking up the ammonia. The sulphate or other salt of ammonia is then obtained by evaporation in the usual way. The non-condensable gases pass off from the condenser into the chimney, or are applied to heating or other purposes.

IMPROVEMENTS IN THE CHEMICAL TREATMENT OF RAW MATERIALS USED IN THE MANUFACTURE OF PAPER, AND IN OBTAINING OXALIC ACID.

(*Coupier and Mellier's Patent, enrolled Aug.* 23.)

THE first part of this invention consists in acting on straw and other vegetable matters used in the manufacture of paper, by means of a boiling solution of caustic potash or soda of specific gravity 1.051 to 1.075. The material, after having been subjected to the action of the alkali, is next well washed, first with hot and then with cold water, after which it is heated with a solution of hypochlorite of alumina or other hypochlorite, of specific gravity 1.022, and again well washed to remove all traces of the hypochlorite. From thirty to forty gallons of dextrine solution are required for each 112 lbs. of fibre operated upon, and about twenty-five per cent. in weight of hypochlorite. This process is also applicable to the preparation of flax and cotton waste for the paper-makers' use.

The second part of the invention consists of heating wood-shavings (pine, elm, ash, beech), with about eighty per cent. of nitric acid, specific gravity 1.332, diluted with water to specific gravity 1.036. Heat is applied, and when the boiling has been continued for a sufficient length of time, the shavings are submitted to the action of a caustic alkaline solution, and after treatment with hypochlorite of alumina as in the first process; in this case, however, only about two per cent. of these ingredients are required to form the solution to be used. The nitric acid solution employed in operating on the first batch of shavings is used, after having about 40 per cent. added to it, for treating a second quantity. In each case, the nitrous fumes evolved are made to pass from the vessel in which the shavings are operated upon, into another vessel, where they come into contact with other moistened shavings, and are partially converted into hyponitric acid. A quantity of oxalic acid may be obtained by evaporating the used acid liquors, also an acid of a character analogous to nitro-picric acid.

APPLICATION OF THE SLAG OF BLAST-FURNACES TO THE PREPARATION OF ALUM, CHLORIDE OF CALCIUM, &c. &c.

(*Cunningham's Patent, enrolled September* 8.)

THE patentee proposes to treat the slag of blast-furnaces with sulphuric acid, so as to act on the lime, silica, and magnesia present, and to convert the alumina into sulphate of alumina fit for the manufacture of alum. The residuary hydrate of silica and gypsum is applicable as manure.

By operating on the slag with muriatic acid, the patentee obtains chloride of calcium, silica, and alumina. He also recommends the employment of the slag in the purification of pyroligneous acid, and in the decomposition of the salts of soda and potash.

To facilitate the action of the acids on the slag, the latter should be run direct from the blast-furnace into water, and then finely ground.

MR. DAWSON'S HAND-BILL.

WE have received from Mr. Dawson a letter and a printed report of a case (which we reported in our last number, page 199, and commented upon, page 151), in which documents he accuses us of "an attack," and of "misrepresenting" his "medical treatment." Immediately on receipt of the same, we informed Mr. Dawson by letter that we should insert some explanatory remarks in this number, and we have wasted an hour and a half in reading all the articles and reports over and over again, with a view of discovering some statement, expression, or word on our part capable of construction into an attack or misrepresentation, or even a reflection upon his medical treatment. We can find nothing of the kind, and cannot conceive what on earth can be his object in circulating his hand-bill, containing as it does nasty details of symptoms which common decency should have induced him to keep to himself, and an exposure of private family affairs which any man having a due regard for professional delicacy and honour would have held sacred and inviolate.

We have received also a letter signed "Medicus" on the same subject, to which the above explanatory remarks will serve as an answer.

BOOKS RECEIVED.

PHILOSOPHY OF THE MECHANICS OF NATURE, *and the Source and Modes of Action of Natural Motive-Power*. By Z. ALLEN. Illustrated with numerous woodcuts. New York: D. Appleton and Co. 1852. Large 8vo, pp. 797.

THE WHIRLWIND THEORY OF STORMS. By Dr. ROBERT HARE.

A PRACTICAL HANDBOOK OF MEDICAL CHEMISTRY. By JOHN E. BOWMAN, F.C.S., &c. Second edition. London: John Churchill, Princes Street, Soho. 1852. 8vo, pp. 261.

A TOXICOLOGICAL CHART, *exhibiting at one view the Symptoms, Treatment, and Modes of detecting the various Poisons, Mineral, Vegetable, and Animal; to which are added Concise Directions for the Treatment of Suspended Animation*. By WILLIAM STOWE, M.R.C.S.E. Eleventh edition. London: S. Highley and Son, Fleet Street.

A LETTER TO DR. LYON PLAYFAIR, C.B., F.R.S. *Being a Medical Commentary on the Results of the recent Analysis of the Buxton Tepid Water; to which are prefixed a Statement of the Improvements now in progress at Buxton; and Dr. Playfair's Analytical Report*. By WILLIAM HENRY ROBERTSON, M.D., Senior Physician to the Buxton Bath Charity. London: Bradbury and Evans, Bouverie Street. 1852.

MORSE'S PATENT. *Full Exposure of Dr. C. T. Jackson's Pretensions to the Invention of the American Electro-Magnetic Telegraph*. By Hon. AMOS KENDALL, late Postmaster-General, U. S. Washington: Printed by J. T. Towers. 1852.

ON SPERMATTORHŒA. By R. DAWSON, M.R.C.S.

TO CORRESPONDENTS.

Mr. Henry Scholefield has sent the following Recipe for CUSTARD POWDER, in reply to a former correspondent, C. H., Leamington:—

℞ Gum Tragac. pulv. 2 oz.
Pulv. Farinæ (potato starch) 1lb.
Pulv. Curcumæ ʒiiss.
Ol. Ess. Amygdal. ʒss.
Ess. Limonis ʒi. ɱj. Put up in one ounce packets. From one pint of new milk, take two table-spoonfuls to rub up with the powder; boil the remaining milk with two ounces of lump sugar, and pour, while boiling, into the basin, stirring quickly meanwhile until thoroughly mixed. Bake as a custard.

A Subscriber (Dereham).—CAMPHOR BALL. Melt 3 dr. of spermaceti and 4 dr. of white wax with 1 oz. of almond oil, and stir in 3 dr. of powdered camphor.

J. A. (M.P.S.)—CAMPHOR ICE may be made by melting 1 dr. of spermaceti with 1 oz. of almond oil, and adding 1 dr. of powdered camphor.

An old Member (Mile End).—We cannot recommend the addition of any colouring-matter to palm-oil that has lost its colour.

An Enemy to a Kibe (Sittingbourne) wishes for a formula for chilblain liniment. "White liniment," see vol. ix., p. 47, is a good application, or the following: ℞ Soap Liniment 1 oz., Cajeput-oil ½ oz., Tincture Cantharides ½ oz. Mix.—Beasley.

M. P. S. (Reading) would be glad to know of any simple mode of preserving clarified honey from crystallizing, when boiled for a short time to render it thicker.

S. F. G. (Settle), *S. C. S.*—The chemical change which coffee undergoes in the process of roasting is now under investigation by a Commission on the part of the Government.

Jeune Chimiste.—We are always glad to answer reasonable questions, but cannot undertake analyses at the request of anonymous correspondents.

We have never seen tasteless black draught.

Amator Scientiæ (Salford).—(1.) Bowman's *Practical Chemistry*, or Fownes's *Manual*.—(2.) The study of Botany is requisite.—(3.) Lindley's *Elements of Botany*, 12*s.*, published by Taylor, Walton, and Co., or Balfour's *Manual*, 12*s.* 6*d.*

G. S. K. (Doncaster).—The *Veterinarian*, published monthly by Longman and Co.

Inexpertus (Yarmouth).—Lindley's *Elements of Botany*, 12*s.*, or Balfour's *Manual*, 12*s.* 6*d.*

J. S. (Devonport).—Dana's *Mineralogy*.

Amicus (Leeds) will find some articles of the length and description he desires in this and our last numbers. We think the pages of a monthly journal may be more usefully filled by other matter than by courses of elementary lectures.

A Correspondent (London, Oct. 15), who desires to become an Associate of the Pharmaceutical Society, would obtain the information he desires by personal application to the Secretary.

BRISTOL SCHOOL OF CHEMISTRY.—Mr. Griffin, the professor of this school, informs us that he delivers two elementary courses of lectures every year, viz., in the spring and autumn, each course consisting of twenty lectures.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. CHURCHILL, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XII.—No. VI.—DECEMBER 1st, 1852.

THE NEW BYE-LAWS AND REGULATIONS OF THE PHARMACEUTICAL SOCIETY,

RELATING TO THE ADMISSION OF MEMBERS AND ASSOCIATES.

It having been decided that it was desirable to extend the basis of the Pharmaceutical Society by a liberal interpretation of the law, in the admission of Members and Associates, it became a question for serious consideration in what manner this could be effected, having regard, at the same time, to the character of the Society, and the circumstances and claims of the parties to be admitted.

It has already been explained, that in consequence of the existing bye-laws, which are confirmed absolutely until next May, restricting the admission, without examination, to those who were either in business before the date of the Charter, or Associates before July 1, 1852; it is impossible, while these bye-laws remain in force, to admit by certificate those who commenced business after the date of the Charter and before the passing of the Act. It is desirable, as early as possible, to discontinue the admission of Members, under any circumstances, without examination; and if no steps had been taken before next May, when the restrictive bye-laws will cease to be in force, much delay would have been occasioned, which the new bye-laws (see page 265) will obviate. By the next Annual Meeting in May, time will have been allowed to complete the list of those whom it may be desirable to admit; their claims and qualifications will have been duly considered, and their names registered as Chemists and Druggists. The new bye-law provides for their admission at the earliest time at which this could be legally effected, and then shuts the door against that mode of admission. Those who desire to join the Society, and who from their standing in the trade may have a fair claim to admission by certificate of qualification, must lose no time in making application and substantiating their claim, as the opportunity will be lost unless they apply before the 1st of May.

The above bye-laws do not apply to the admission of Associates who, according to the terms of the Charter, must pass the examination; and, as it was considered equally fair and desirable to extend a similar leniency for a limited period to the Assistants of the present day, this could only be effected by a temporary modification of the examinations. The regulations of the Board of Examiners (page 266 of this number) are framed for this purpose, and are calculated to attain the desired object without interfering with the gradual improvement in the examinations, or lowering the value of the certificate, now awarded by the Board to successful candidates. Hitherto this has been the "pass certificate;" it has represented the minimum standard of qualification with which a candidate could obtain admission into the Society. But the same certificate at the commencement of the Society represented a qualification considerably lower than that which it implies at the present time, as the examinations have been gradually becoming more stringent. According to the new regulations this certificate will continue in use, its value gradually rising as before; but for a limited period it will cease to be the "pass certificate," which latter will be awarded to candidates possessing a practical knowledge of their business although not coming up to the standard of qualification now represented by the certificate before mentioned. In other words, the value of the pass certificate of the present time will be equivalent to that of the original or ordinary certificate at the time the Society was established. This regulation will open the door to many young

men who have had much practical experience in the business, but who are not prepared for the innovation which the Pharmacy Act is about to introduce; at the same time it will not retard the progress of the Society in raising the scientific qualifications of future Members.

If the Pharmacy Act had been compulsory, a different line of policy might have been adopted, but this would have been attended with considerable injustice.

In that case all Assistants and Apprentices would have been obliged either to acquire the full qualification, or, failing the means, they must have relinquished a business in learning which they had hitherto done all that the law required, and wasted several years in an apprenticeship ending in disappointment.

No such injustice is contemplated by the Pharmacy Act. It operates not by coercion but by attraction, and the amount of effect to be derived from it will depend on the inducement offered to young men to come within its influence. The leniency contemplated in the new regulations will attract many who would otherwise have despaired of success, and shrunk altogether from the ordeal. Some of these, having obtained the pass certificate, will not rest satisfied until they have gone a step further; and the "certificate of honour" will be an additional source of ambition to young men of superior attainments. The above regulations will continue in force during the time that similar leniency is extended to candidates for Membership under the new bye-law, namely, until the Annual Meeting in May, 1853; after which time the "pass certificate," in the sense in which the term is now employed, will be discontinued, and those only will be admitted to registration who obtain that which is described in the regulations as the "ordinary certificate."

THE LECTURES AT THE SCHOOL OF PHARMACY.

For the convenience, and at the particular desire of many Members and Associates of the Society, it was decided that a portion of the lectures during the present session should be delivered in the evening. The lectures so delivered comprise some of the most important and interesting subjects in each course, such as may be attended with advantage as single lectures by those whose business engagements do not admit of a regular attendance. All the lectures are free to Members and Associates, consequently the only consideration demanded for these instalments of knowledge is the trouble of going to and from the lecture-room at the time appointed, and the appropriation of an hour or two twice a month.

Judging from the number who avail themselves of the evening lectures, and recollecting the anxiety which was expressed prior to the commencement of the session in favour of the arrangement, we are inclined to suspect that many of the Members and Associates have either failed to observe the notice on the official page of the cover of this Journal, or have forgotten the days on which the lectures are delivered. We therefore, remind our readers that The Pharmaceutical Meetings are held on the Second Wednesday in each month, at Nine in the evening; and the Lectures referred to are delivered on the Third and Fourth Wednesdays, at the same hour.

In another part of this number we publish a paper by Mr. H. Scholefield, entitled "Pharmaceutical Education, Means to the End," which contains a proposal "to make the lectures portable, so as to be heard in every district in the country." It is proposed that a reporter should be employed to reduce the original lectures to writing, and to "describe in marginal notes the experiments performed, with a sketch of the apparatus used, and specimens exhibited" (He must be a clever reporter, fully conversant with the subject, and a rapid draughtsman.—Ed.) The lectures so reported to be re-delivered in the

provinces; apparatus, specimens, charts, and materials of illustration being provided in the several localities.

Our correspondent appears not to be aware that the diagrams belonging to the Society and required for the lectures amount to several hundreds, and that their average cost is not less than five shillings. The apparatus, including that which is the property of the professors, cannot be estimated at less than £1000. The Museum, which supplies the specimens, is the result of about eleven years' labour and great expense, although a large number of the specimens were presented to the Society. The effectual illustration of the lectures in the country would, therefore, be impossible, even if they could be reported; but we maintain that lectures of that description *cannot be reduced to writing*. The words may be written, but the delivery, the manipulation, the illustrations which constitute the superiority of a lecture over instruction conveyed in books, are peculiar to the professor and the institution in which the requisites are provided. In a lecture the two senses—sight and hearing—assist each other, and the skill of the lecturer consists in the manner in which he adapts his words and delivery to the illustrations before him, so as to make a clear and lasting impression on his audience. A most impressive lecture, reported *verbatim*, in the absence of these accessories, would be nothing more than an imperfect treatise in the rough state, wanting the final revision of the author to adapt it for publication. As a lecture it might be unrivalled, but as a treatise less suitable for reading than a chapter in Fownes's Chemistry or Pereira's Materia Medica, either of which, being complete in itself without illustrations, might be read and discussed by Members and Associates in the country with manifest advantage. We have published and animadverted upon Mr. Scholefield's proposition because it is the echo of sentiments continually expressed by correspondents reduced to a tangible form. It denotes the great desire which prevails for the advantage of lectures where this does not exist, while experience shows that where lectures are provided the great difficulty consists in inducing young men to attend. It might almost be laid down as an axiom in chemical science, that "the desire to attend lectures is inversely in proportion to the facilities enjoyed by students;" that is to say, those who reside in remote localities where attendance is impossible, are loud and deep in their murmurs at the privations they suffer, while those who have instruction brought almost to their doors, and who are coaxed and entreated to attend, are with difficulty persuaded to walk half a mile for that purpose. The remedy for any indifference which may exist with regard to the means of instruction offered to students will eventually be found in the extensive rejection of candidates by the Board of Examiners; and this they must be prepared to expect after the month of May next year, when the examinations will begin to assume the complete and stringent character which is contemplated under the Pharmacy Act.

It must be understood that these observations are not intended to apply universally. There are many students whose diligence and industry are worthy of imitation. To these we say, go on and prosper. But there are others, and we fear the majority, who are not yet sensible of the importance of keeping pace with the times, and who will discover their mistake when their qualifications are put to the test.

COMPETITION FOR PRIZES.

It is a common error to mistake the means for the end. When a prize is offered for competition, the announcement is received very differently by the several students in the class. Some treat it with indifference: they ask themselves the old question *cui bono?* of what use would a prize be to me? It would cost me much labour and anxiety—the sacrifice of recreation—the dread

of defeat—and, after all, it is only a book which I should seldom if ever use, or a medal which I should put away and forget. Others, though by no means indifferent, hesitate at the threshold. Their motto is, "Fain would I climb, but fear to fall." They are diffident of their own abilities, and on looking round at some of their competitors, who are reputed to be clever, they think they have no chance, and give up the idea of entering the lists. In a class of thirty or forty there may probably be not more than six or eight "prize men"—students who, from the regularity of their attendance, their aptitude in learning, and their evident determination to master the subject—acquire among their fellows the character of young men of superior ability and formidable competitors. It is soon generally understood in the class that the trial of strength will be between these individuals—hence their title of prize men.

As the time of the decision draws near, the competition becomes warmer and narrower; some of the candidates redouble their efforts; others become discouraged, and either retire from the struggle or plod onwards with the listlessness of a man who feels conscious that a defeat stares him in the face.

When the contest is over and the prizes awarded, the successful competitors congratulate themselves on the attainment of the object for which they have laboured; those who have had a narrow escape of a victory are disappointed, and probably think they have laboured in vain. The majority of the class feel no disappointment; they never expected a prize, and when they hear the eulogiums on the successful candidates they are confirmed in their previous impression that it would have been fruitless for them to enter into the competition, and congratulate themselves on their escape from the trouble, worry, and defeat.

If this were the only result to be derived from a competition for prizes, the utility of such competitions might be called in question. It is natural for the successful candidate to be elated with his victory, and those whom he has defeated may at the time feel some degree of mortification, especially if the contest had been a severe one; but there is less difference in the amount of real benefit derived by the competitors than some persons suppose. A prize may be put away and forgotten: the knowledge acquired in the competition is a lasting advantage. The ephemeral distinction is conferred on one or two who take the lead, but all the competitors participate in the permanent benefit. Those who gain nothing are the idle, the indifferent, and the faint-hearted, who will neither take the trouble nor run the risk of entering into the contest. It is not always the most talented who gain the prize. The tortoise sometimes outruns the hare, and moderate abilities, with persevering diligence, are more likely to ensure success than brighter genius, when the consciousness of its possession gives rise to undue confidence, and the impression that the object may be attained without labour. We therefore advise all to compete who have the opportunity of so doing, remembering that, whether they obtain prizes or not, they will not lose the reward of their labour.

There is one peculiarity in the present regulations (page 266) which is worthy of notice—the competition is open to all Associates and registered Apprentices. Whether they have been educated at the School of Pharmacy in London, in a Provincial school, or by reading and study without the advantage of public instruction, all may present themselves as candidates, and will be eligible to receive prizes according to their desert. It must be admitted that those who have passed through a regular systematic education will be in the most advantageous position; but others may, by unusual private exertion, attain the same amount of proficiency, and it is the desire of the Council to observe strict impartiality, and to award the prizes to the most deserving.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PROPOSED BYE-LAWS.

I.

Chemists and Druggists who commenced business on their own account after the date of the Charter, and prior to the passing of the Act 15th and 16th Vic., c. 56, 30th June, 1852, and who shall, before the 1st May, 1853, apply to be admitted as Members by Certificate of qualification according to the terms of the Charter, shall, on production of Certificates satisfactory to the Council, be registered as "Chemists and Druggists certified to be duly qualified for admission as Members of the Society." The Register on which the names of such Chemists and Druggists shall be entered, shall be closed on the day of the Annual Meeting of the said Society in the month of May, 1853, when the existing bye-laws will cease to be in force, after which time the persons so registered shall be admitted as Members of the Society on payment of the entrance fee, and the subscription for the current year. No person whose name is not included in the said Register, unless an Associate coming within the terms and meaning of the next following bye-law, shall, after the period aforesaid, be admitted as a Member of the Society, except in the manner provided in the 10th section of the Act.

[*Tenth Section of the Act.*—"X. Every such person who shall have been examined by the persons appointed as aforesaid, and shall have obtained a Certificate of qualification from them, shall be entitled to be registered by the registrar, according to the provisions of this Act, upon payment of such fee or fees as shall be fixed by the bye-laws; and every such person duly registered as a Pharmaceutical Chemist, shall be eligible to be elected as a Member of the said Society; and every such person duly registered as an Assistant shall be eligible for admission as an Associate of the said Society; and every such person duly registered as a Student or Apprentice to a Pharmaceutical Chemist, shall be eligible for admission into the said Society, according to the bye-laws thereof."]

II.

Associates of the Society who were admitted as such prior to the 1st day of July, 1842 (mentioned in the present bye-laws, section 1) shall be admitted as Members of the Society, on the production of Certificates satisfactory to the Council.

[*Extract from Section I., referred to above.*—"I. All persons desirous of becoming Members (except such Associates of the Society as were admitted prior to the 1st July, 1842, and except such persons as were or had been established on their own account as Chemists and Druggists at or prior to the 18th February, 1843), shall, in the first place, pass such an examination as the Council shall think fit and require; and which examination shall be styled the Major Examination."]

The above bye-laws having been settled by Mr. Tidd Pratt, and transmitted to the Secretary of State for approval, the following communication has been received:—

"*Whitehall, 3d November*, 1852.

"SIR,—I AM directed by Mr. Secretary Walpole to acknowledge the receipt of your letter of the 25th ult., and to inform you that he is prepared to approve of the two Bye-laws which accompanied your letter of the 22d of September, if they are confirmed by a Special General Meeting of the Pharmaceutical Society.

I am, Sir, your obedient Servant,

"*To* JACOB BELL, ESQ. WM. J. H. JOLLIFE."

In consequence of the receipt of this communication from the Secretary of State,

A SPECIAL MEETING OF THE COUNCIL

was summoned by the President, and it was resolved,

That a SPECIAL GENERAL MEETING of the Society be convened, to be held

at the House of the Society, 17, Bloomsbury Square, on WEDNESDAY EVENING, the 8TH of DECEMBER next, at Eight o'clock precisely, for the purpose of confirming the above bye-laws in accordance with the provisions of the 15th and 16th Vic., cap. 56.

FORM OF CERTIFICATE proposed for adoption under the new Bye-laws:

To the Council of the Pharmaceutical Society of Great Britain.

We, the undersigned Members of the Pharmaceutical Society of Great Britain, hereby certify, that Mr. of in the county of commenced business on his own account as a Dispensing Chemist, before the passing of the Pharmacy Act, June 30th, 1852, and that we consider him duly qualified, and a desirable person for admission as a Member of the Pharmaceutical Society.

Dated this day of 185

To be signed by Two Members of the Society, and countersigned by the local Secretary.

FORM OF APPLICATION for admission to accompany the above CERTIFICATE:—

To the Council of the Pharmaceutical Society of Great Britain.

GENTLEMEN,—In applying for admission as a Member of the Pharmaceutical Society, I beg to state that I was apprenticed (or a pupil) to Mr. of A.D. 18 and was Assistant with Mr. and commenced business on the of 18

I am, &c., &c.

REGULATIONS OF THE BOARD OF EXAMINERS,

Passed at a Special Meeting of the Board, October the 27th, and confirmed by the Council, November the 3rd, 1852.

1. Every Candidate who shall have passed the MINOR EXAMINATION shall receive from the Board of Examiners a Pass Certificate, stating that he is qualified for admission as an Associate. Such Certificate shall be delivered to the Secretary and retained by him. Candidates so certified shall be eligible for admission as Associates.

The Board of Examiners shall, at their discretion, award Certificates to Candidates to be retained by them.

2. Every Candidate who shall have passed the MAJOR EXAMINATION shall receive from the Board of Examiners a Pass Certificate, stating that he is duly qualified to become a Pharmaceutical Chemist. Such Certificate shall be delivered to the Secretary and retained by him; and on the production of evidence that he is in business on his own account, he shall be eligible for admission as a Member of the Society.

The Board of Examiners shall, at their discretion, award Certificates to Candidates to be retained by them. The ordinary Certificate to be so awarded shall be the one which is at present in use. In cases of extraordinary proficiency, on the passing of a special examination for that purpose, a Certificate of Honour shall be awarded.

At a MEETING of the LIBRARY and MUSEUM COMMITTEE, held on the 1st of November, a report was agreed upon, recommending the adoption of the following resolutions among others:—

That 1000 copies of the

CATALOGUE OF THE LIBRARY,

including 100 quarto copies, be printed for the use of the Society; which resolution was adopted by the Council, the number of copies being increased to 2000. (Notice will be given as soon as the Catalogue is ready for delivery.)

A list of books was also recommended for purchase, which will be added to the Library, and included in the Catalogue.

It was recommended that two

PRIZES

be offered to the Pupils attending the Lectures on Chemistry and Pharmacy, and two prizes to those attending on Botany and the Natural History of Drugs,

that the distinction between Laboratory and Lecture Pupils be discontinued, and that ALL ASSOCIATES and APPRENTICES be admitted to the competition.

That a Design be obtained for a MEDAL, to be awarded as a Prize in certain cases instead of books.

At a meeting of the Council on the 3d of November, the above resolutions were adopted.

PHARMACEUTICAL MEETING,

Wednesday, Nov. 10, 1852.

MR. DANIEL B. HANBURY IN THE CHAIR.

DONATIONS TO THE LIBRARY AND MUSEUM.

New Dispensatory.
Translation of the Pharmacopœias, by John Thomson.
Elements of the Veterinary Art, by C. Vial de Saintel.
Family Physician, by Alexander Thomson.
Medical Observations, by Laurence Heister, from Mr. G. W. Smith.

Specimen of English Otto of Roses, from Mr. George Whipple.

Specimen of Pemican, brought home by Mr. Kennedy, Commander of the Prince Albert, one of the vessels engaged in the search after Sir J. Franklin, from Mr. Bentley.

Specimen of Hospital Sulphate of Quinine, from Mr. Edward Herring.

Mr. BUSHELL said he was anxious, as a General Practitioner, to make some inquiry respecting one of the specimens on the table, which had just been announced as a donation, under the name of HOSPITAL SULPHATE OF QUININE. He should be glad if any one present would inform the meeting in what respect this preparation of quinine differed from the ordinary sulphate. Is it an impure article, and if so, what is the nature and amount of the impurity?

The CHAIRMAN believed the gentleman by whom it had been presented, and who was the manufacturer, was present, and he would no doubt be willing to furnish the information desired.

Mr. E. HERRING, having been thus appealed to, could only say of the hospital sulphate of quinine, that it is pure, excepting that being unbleached it contains a little colouring matter, the amount of which he believed to be under two per cent. It is made by a peculiar process, in which very little spirit is used, and no animal charcoal is employed for decolourizing it. The cost of its manufacture being thus diminished, its price was from 2*s.* to 2*s.* 6*d.* per ounce less than that of the ordinary commercial sulphate of quinine.

Mr. BELL presumed that the economy of the process depended principally upon the omission of the use of animal charcoal, which, it is well known, absorbs a certain amount of the alkaloid as well as the colouring matter, for the removal of which the charcoal is employed.

Mr. REDWOOD thought it was claiming too much for this article to describe it as pure sulphate of quinine, as it bore on the very face of it the character of impurity in the colour it possessed. The amount of this impurity, however, was no doubt extremely small, and it would probably be inappreciable in its influence on the operation of the medicine. He had examined some of the sample on the table, and found the indications afforded with the usual tests to be similar to those obtained with a sample of sulphate of quinine which he had himself prepared in an unbleached state by one crystallization. It appeared, therefore, to be what he had understood it was represented to be, that is, sulphate of quinine to which the last process of purification had not been applied. Having been less frequently crystallized than the colourless salt of commerce, it would be likely to contain rather a larger proportion of quinidine, as this modification of the alkaloid is more soluble than the quinine salt, and more of it than of the latter would therefore be left in the mother liquor at each crystallization.

NOTES UPON THE DRUGS OBSERVED AT ADEN, ARABIA.

BY JAMES VAUGHAN, ESQ.,
Member of the Royal College of Surgeons of England, Assistant Surgeon in the Bombay Army, Civil and Port Surgeon at Aden, Arabia.

Communicated by Daniel Hanbury.

(*Continued from page* 229.)

Aloes, called *Sibr* by the Arabs, and *Elúá* by the natives of India. But very little of the best description of aloes is brought to Aden; the port of Maculla being much nearer to Socotra, nearly the whole produce of the island is carried thither, whence it is transhipped to Bombay. The price of the drug here, is four rupees six annas (8*s.* 9*d.*) the *mawd*. An inferior description of aloes, called here *Black Aloes*, is brought to Aden in large quantities from the interior. This sells for two rupees the *mawd*, and 1600 pounds are reported to have passed the Custom-house last year (1851)*.

Senna.—*Cassia elongata* (Lemaire-Lisancourt) is the species of *Cassia* which grows commonly in southern Arabia and on the opposite coast of Africa.

Senna Mekki صنا مكّي is the name by which it is known here and in India.

Of late years the trade in this drug has considerably increased, a large quantity being taken by the Americans in exchange for their cotton long-cloths, the principal material used for domestic purposes by the Arabs of the interior. Little or no senna is sent from the Somali country for exportation, though the plant is common there and grows close to the sea-beach. The Somalis seem to be ignorant of its purgative properties. Senna abounds throughout Yemen and Hadramaut; from thence it is transported to Mocha and other ports of the Red Sea for exportation. Latterly, a considerable quantity has been brought into Aden from the interior. Last year, thirty tons passed through the Custom-house †.

Indigo, called by the Arabs and natives of India, *Neel* نيل. A large quantity of this article, much inferior to the Indian indigo, is manufactured at Mocha and other towns in southern Arabia. It is extensively used by the Arabs in dyeing the white cotton long-cloths above-mentioned, and in fact it pervades almost every part of their dress. Whether unavoidably, because they are far from being adepts in dyeing, or from design, the colour generally stains their half-naked bodies, and this together with the peculiar smell of indigo, they seem to consider highly genteel, thus forming a striking contrast to the females, and especially to the Jewish women, who prefer a yellow tinge and to that end dye their skins with a decoction of turmeric.

The indigo above-mentioned sells in the Aden market for eleven rupees the *mawd* of 28 lbs. Sixteen hundredweight of this article were entered at the Custom-house last year ‡.

Kát قات the name of a drug which is brought into Aden from the interior and largely used, especially by the Arabs, as a pleasurable excitant. It

* Three samples of Aloes accompanied this notice:
1. Aloes from Hadramaut.
2. Socotrine Aloes.
3. Aden or Black Aloes.
The last named has a fœtid, sulphurous odour.—D. H.

† The author has transmitted two samples of Senna, marked respectively *Aden Senna* and *African Senna*. They would be known in the London market as *Inferior East Indian Senna*.—D. H.

‡ An excessively impure indigo, leaving after ignition no less than 94.4 per cent. of ashes. Two samples of fine indigo from another source, afforded respectively only 6.2 and 9.2 per cent.—D. H.

Bundle of *Subbare Kát*, nearly one-half the natural size.

is generally imported in small camel loads, consisting of a number of parcels each containing about forty slender twigs with the leaves attached, and carefully wrapped so as to prevent as much as possible exposure to the atmosphere. The leaves form the edible part, and these when chewed are said to produce great hilarity of spirits and an agreeable state of wakefulness. Some estimate may be formed of the strong predilection which the Arabs have for this drug, from the quantity used in Aden alone which averages about 280 camel loads annually. The market price is 1¼ rupees per parcel, and the exclusive privilege of selling it, is farmed by the government for 1500 rupees per year. Forskál found the plant growing on the mountains of Yemen, and has enumerated it as a new genus in the class Pentandria, under the name of *Catha*. He notices two species and distinguishes them as *Catha edulis* and *Catha spinosa*. According to his account it is cultivated in the same ground

Bundle of *Mukarree Kát*, one-half the natural size.

as coffee, and is planted from cuttings. Besides the effects above stated, the Arabs, he tells us, believe the land where it grows to be secure from the inroads of plague and that a twig of the *Kát* carried in the bosom, is a certain safeguard against infection. The learned botanist observes with respect to these supposed virtues: "*Gustus tamen foliorum tantam virtutem indicare non videtur* *."

Like coffee, *Kát* from its acknowledged stimulating effects, has been a fertile theme for the exercise of Mahommedan casuistry, and names of renown are ranged on both sides of the question, whether the use of *Kát* does or does not contravene the injunction of the Koran: *thou shalt not drink wine or anything intoxicating*. The succeeding notes borrowed chiefly from De Sacy's researches may be deemed worthy of insertion here.

Sheikh Abd-ool-Kâder Ansari Jezeri, a learned Mahommedan author, in his treatise on the lawfulness of the use of coffee †, quotes the following from the writings of Fakhr-ood-Deen Mekki:—"It is said that the first who introduced coffee was the illustrious saint Aboo Abdallah Mohammed Dhabhani ibn Said; but we have learned by the testimony of many persons, that the use of coffee in Yemen, its origin and first introduction into that country, are due to the learned and godly Ali Shadeli ibn Omar, one of the disciples of the holy doctor Nasr-ood-Deen, who is regarded as one of the chiefs among the order Shadheli, and whose worth attests the high degree of spirituality to which they had attained. Previous to that time they made coffee of the vegetable substance called *Cafta*, which is the same as the leaf known under the name of *Kát*, and not of *Boonn* (the coffee-berry), nor any preparation of *Boonn*. The use of this beverage extended in course of time as far as Aden; but in the days of Mohammed Dhabhani, the vegetable substance from which it was prepared disappeared from Aden. Then it was that the Sheik advised those who had become his disciples to try the drink made from the *Boonn*, which was found to produce the same effect as the *Kát*, inducing sleeplessness, and that it was attended with less expense and trouble. The use of coffee has been kept up from that time to the present."

D'Herbelot states that the beverage called *Cahuat al Catiat, or Caftah*, was prohibited in Yemen in consequence of its effects upon the brain ‡. On the other hand a synod of learned Mussalmans is said to have decreed: that as beverages of *Kát* and *Cafta* § do not impair the health or impede the observance of religious duties, but only increase hilarity and good humour, it was lawful to use them as also the drink made from the *Boonn* or Coffee-berry.

I am not aware that *Kát* is used in Aden in any other way than for mastication. From what I have heard, however, I believe that a decoction resembling tea, is made from the leaf by the Arabs in the interior; and one who is well acquainted with our familiar beverage, assures me that the effects are not unlike those produced by strong green tea, with this advantage in favour of the *Kát*, that the excitement is always of a pleasing and agreeable kind ‖.

* *Flora Ægyptiaco-Arabica, Hasselquist*, 1775. 4to., page 64.

† For an extract from this treatise, *vide Chrestomathie Arabe, ou Extraits de divers écrivains Arabes, tant en prose qu'en vers, avec une traduction Française et des notes, par M. le Baron Silvestre de Sacy. Seconde édition. Paris*, 1826. Tome 1, p. 412.

‡ *Bibliothèque Orientale*, La Haye. 1777. Tome 1. page 461. article *Cahuah*.

§ The Arab writer seems here to distinguish *Kát* from *Cafta*, although they are previously spoken of as synonymous. Upon this De Sacy remarks "Peut-être le *Kát* est-il la feuille même de cet arbre, et le *Cafta* une préparation artificielle faite avec cette feuille." *Chrestomathie Arabe*, Tome 1, pp. 462-3. Note 40.—D. H.

‖ Mr. Vaughan has transmitted two specimens (figured on the other side), called respectively *Subbare Kát* and *Multaree Kát*, from the districts in which they are produced. The first named is considered of superior quality, the bundle sent which weighs nearly 2½ ounces, being worth at den two annas (*8d.* sterling). The *Multaree Kát* which consists of shorter shoot is not so much esteemed and consequently fetches a lower price.

Catha edulis Forsk. Nat. ord. *Celastraceæ*, is figured in Dr. Lindley's *Vegetable Kingdom* (Lond. 1846, 8vo.) page 586. But there is a still more complete representation of the plant under the name of *Catha Forskalii* Richard, in a work published under the auspices of the

Wabei وابي a poisonous tree which grows in the Somali country on the Habber-Gerhajjis range of the Gooleis mountains, where it attains the height of twenty feet. The poison is obtained by boiling the root in water until the decoction attain the consistency of an inspissated juice. When cool, the barb of the arrow is anointed with the juice which is regarded as a virulent poison, rendering a wound tainted with it incurable *.

(*To be continued.*)

ON EXTRACT OF COLOCYNTH AND COMPOUND COLOCYNTH PILL.

BY ALFRED ALLCHIN, F.C.S.

Soon after the Pharmacopœia of 1851 was published, I prepared some compound colocynth pill for use in dispensing, but the very powerful effects which were produced by it in several instances which came under my notice, made me hesitate before substituting this preparation for the compound extract of colocynth of the previous Pharmacopœia.

I have brought the subject under the notice of the Society this evening, partly with the view of ascertaining if any of those present have noticed similar results, and also for the purpose of discussing the probable cause of the difference in the effects of the two preparations.

On comparing the formula for compound colocynth pill with that for compound extract of colocynth, the only difference is found to be, that in the former simple extract of colocynth made with cold water is substituted for the extract made by treating colocynth pulp with proof spirit, which was ordered in the latter. One part of simple extract is thus substituted for three parts of colocynth pulp, the other ingredients being the same in both formulæ.

Now, Mr. Squire states that colocynth pulp yields one third of its weight of

French Government and entitled *Voyage en Abyssinie exécuté pendant les années* 1839, 1840, 1841, 1842, 1843, *par une commission scientifique composée de MM. Théophile Lefebvre, Lieut. de vaisseau, A. Petit et Quartin-Dillon, docteurs-médecins, naturalistes du Muséum, Vignaud, dessinateur*. The botanical portion of this work by M. Achille Richard, is regarded either as a part of the *Voyage en Abyssinie*, or as a distinct publication under the title of *Tentamen Floræ Abyssinicæ*. The leaves of the plant as represented by this author are somewhat narrower than those of the specimens received from Arabia.

M. Richard enters into some particulars relative to the synonyms of the plant, from which it appears that Vahl referred Forskål's genus *Catha* to the Linnean genus *Celastrus*, changing the name of *Catha edulis* for that of *Celastrus edulis*. Hochstetter applied the name of *Celastrus edulis* to an Abyssinian species (*Celastrus obscurus*, Richard) which he imagined identical with Forskål's *Catha edulis*, while of the real *Catha edulis*, Forsk., he formed a new genus and species, under the name of *Tricosmoldeca serrata*, Hochs., Nat. ord. *Hippocrateaceæ*.

I quote the following references from the *Tentamen Floræ Abyssinicæ*, vol. i., p. 134 :—

"*Catha Forskalii*, Nob, *Cathæ* No. 4, Forsk., loc. cit. [*Flor. Ægypt. Arab.*, p. 63]. *Tricosmoldeca serrata*, Hochs., in *pl.* Schimp. *Abyss.*, sect. ii., No. 649. *Celastrus edulis*. Vahl., *Enel.*, i. 21."

Although in the *Flora Ægyptiaco-Arabica* of Forskål, no specific name is applied to the Catha at p. 63, it is enumerated as *Catha edulis* at p. 107.

The reference to *Celastrus edulis* is not contained in the *Eclogæ Americanæ* of Vahl, but in that author's *Symbolæ Botanicæ* (Hafniæ, 1790, 8dio) pars. i. p. 21.—D.H.

* Some dried branches of the *Wabei*, as well as a specimen of the root, have been forwarded by Mr. Vaughan. My friend Mr. Kippist after a careful examination, has expressed the opinion that the branches in question (which unfortunately bear neither flowers nor fruit) have the general aspect of those of a plant belonging to the nat. ord. *Apocyneæ*. Having searched in accordance with this suggestion, I find that *Carissa Schimperi*, Alph. De C. (Prod viii. p. 675 bears an extremely close resemblance, so far as leaves and stem are concerned, to Mr. Vaughan's plant. *Carissa Schimperi* is described and figured by M. Richard in the *Tentamen Floræ Abyssinicæ*, vol. ii., p. 31, Atlas Tab. 68. It is synonymous with Hochstetter's *Strychnos Abyssinica*, with Schimper's specimens of which (*Sectio prima*: Plantæ Adoënses, No. 254) as contained in the herbarium of the British Museum and in that of my friend Mr. N. B. Ward, I find the *Wabei* very closely to agree.—D.H.

extract to proof spirit, and the authors of the new process seem to have assumed that a similar result is obtained by treating the colocynth with cold water, according to the process now given for preparing the simple extract, in which case the strength of the compound colocynth pill would have coincided with that of the compound extract which it has replaced.

Having found, as already stated, that compound colocynth pill made strictly according to the instructions of the Pharmacopœia, produced much more powerful effects than the compound extract, administered in the same doses, I concluded that either the simple extract made with cold water differs in properties from the extract made with proof spirit, or that the proportion of simple extract now ordered is more than equivalent to the pulp formerly used.

It appears from the results of some experiments I have made, that simple extract of colocynth prepared according to the instructions of the Pharmacopœia, consists principally of the peculiar better principle of the colocynth, named colocynthine. I have obtained from the extract as much as 72 per cent. of this principle in a pure state, and possessing all the characters ascribed to it in chemical works. The quantity of extract yielded by the process of the Pharmacopœia, in which the colocynth is treated with only twice its weight of cold water, is about 12½ per cent. of the weight of the colocynth. These facts seemed at once to account for the different effects of the compound colocynth pill and compound extract of colocynth. But the question now arose in my mind as to whether the quantity of cold water, ordered in the Pharmacopœia, was sufficient to exhaust the colocynth of its active principle. I find it is not, for on treating the pressed mark, from which the extract has been made according to the Pharmacopœia, a second and a third time with cold water, products are obtained which are as rich as the first in colocynthine. Extracts marked 1, 2, 3, thus prepared, are on the table. It will be observed, however, that extracts 2 and 3, those made by the second and third addition of water, differ in appearance and in odour from that first extracted, with the quantity of water ordered. This I think may arise from some decomposition caused by the long continued maceration of the pulp; for I find if the whole of the increased quantity of water, about three or four times as much as the Pharmacopœia orders, be added at once, the resulting extract, although greater in quantity, is the same in quality, as that made according to the Pharmacopœia process. By thus increasing the quantity of water, I have obtained an extract corresponding with the description I have already given, and amounting to 25 per cent. of the weight of the colocynth operated upon. This is the largest amount of extract the colocynth will yield by treating it with cold water.

This extract is essentially different from the simple extract of colocynth of the Pharmacopœia of 1836, which was prepared by boiling the colocynth pulp for six hours. The product of this process amounted to about 60 per cent. of the weight of the colocynth, and necessarily contained a large proportion of inert matter. It thus appears that the simple extract of colocynth of the present Pharmacopœia although amounting, when made according to the instructions given, to one-eighth part of the weight of the colocynth from which it is obtained, nevertheless represents in activity only four parts of colocynth, as this quantity of the pulp is capable of yielding one part of such extract when treated with sufficient quantity of cold water. It also appears that the colocynth when treated with spirit, aided by heat, as in the process for the preparation of the compound extract, yields one-third of its weight of extract; therefore the former may be considered to contain more of the active principle of the colocynth than the latter, in the proportion of four to three, and to this extent the activity of the compound colocynth pill might be assumed to be increased, by the substitution of the aqueous for the alcoholic extract of colocynth, in as far as relates to this part of its composition.

I am disposed to think, however, that the difference in the activity of the two preparations is greater than would be thus accounted for; and that this is partly owing to the longer continuance of the application of heat in the preparation of the alcoholic extract, than of the cold aqueous extract, by which the properties of the colocynthine are modified. In support of this view, I may refer to the fact that, in the Prussian Pharmacopœia, express directions are given that a boiling temperature should be avoided in preparing extract of colocynth.

In directing my attention to this subject, I have found that the colocynth itself, as met with in commerce, is subject to some variation which may affect the activity of the extract. There are two specimens on the table, which are both sold as Turkey colocynth, but which differ in some of their characters.

Mr. D. Hanbury thought the substitution of the compound colocynth pill of the present Pharmacopœia, for the compound extract of colocynth previously ordered, would not be justifiable under any circumstances. He concluded that the change in the name had been made with the view of distinguishing the new preparation from the old, and of enabling medical men to order either of them without incurring the liability of having the other used.

Mr. Allchin considered the compound colocynth pill the representative of the compound extract, and that the College had intended it to be adopted as such. In confirmation of this view, he found that, in the index to the new Pharmacopœia, under "extractum colocynthidis compositum," reference is made to the formula for compound colocynth pill, the two names being represented as synonymous.

Mr. Redwood thought the authors of the Pharmacopœia had intended the new preparation to be the same as the old, all the ingredients, with the exception of the colocynth being the same in both formulæ, and the only difference in the colocynth being that in the old formula the colocynth was directed to be exhausted with proof spirit, while in the new, cold water is directed to be substituted for the spirit. As colocynthine, the active principle of the colocynth, is equally soluble in both these menstrua, it might very naturally have been inferred that the same results would have been obtained by either of these processes. Mr. Allchin's experiments, however, seem to indicate that the two preparations referred to differ greatly in their properties, and there could no longer be any doubt of the impropriety of substituting the compound colocynth pill for the compound extract.

Mr. Bell observed that the two preparations appeared, according to the calculations and experiments of Mr. Allchin, to be pharmaceutically very similar; but he thought it was desirable to obtain more evidence with reference to their medicinal effects, and would suggest that experiments should be made with them at some hospital.

The Chairman said, he could confirm Mr. Allchin's statement in regard to the powerful action of the compound colocynth pill. A case had recently come under his notice in which three grains of this pill had produced very powerful effects upon an adult.

Mr. Tustin stated, that some of the compound colocynth pill which Mr. Allchin had given to Dr. Pereira had been administered to patients at the London Hospital, and he had found that one grain acted as a strong purgative.

Dr. Garrod thought it very desirable that the medicinal effects of the preparation under notice should be fairly tested in comparison with those of the compound extract, and offered to undertake some experiments with this view, the results of which he would communicate to the Society on a future occasion.

Mr. Hooper suggested the necessity of observing the consistence of the simple extract of colocynth used in making the compound colocynth pill. The simple extract he had prepared according to the Pharmacopœia was in a pulverulent state, while some that he had seen had the consistence of a soft extract. This difference, he thought, might in some degree account for the greater activity observed in the effects of some samples of the colocynth pill than in others.

ON A NEW CRYSTALLINE BODY FROM HELLEBORUS NIGER.

BY MR. WILLIAM BASTICK.

The natural order Ranunculaceæ contains a number of plants of great activity on the animal economy; and most of these employed as medicinal agents have been thoroughly examined by Chemists, by whom their active principles have been separated beyond doubt. It has been found, as is well known, that these active principles are organic bases of extreme virulence, and possess the properties of the plants from which they are derived, in a highly concentrated form. Black hellebore root has been several times examined for the purpose of ascertaining what were its active constituents, and more especially to learn whether, like other members of this family, it contained an organic base. Vauquelin ascribed its activity to the presence of an acrid oil, and Gmelin to a soft resin which exists in it. The most recent and complete examination of black hellebore root is that of MM. Feneulle and Capron,* whose researches were principally directed to prove the absence or presence of an alkaloid in this root. However, they came to the conclusion that no such body existed in it, and that its activity was due to a combination of a fatty oil with a volatile acid, which they separated from it. Doubting the truth of their conclusions, and reasoning from analogy, I was led to believe that by the improved methods of research of the present day, an organic base might be extracted from it; I therefore employed a method which experience has shown will eliminate an alkaloid from any substance, if any such alkaloid, soluble in ether, exist therein, and which is as follows:—

The black hellebore root was finely bruised and macerated with alcohol, containing $\frac{1}{20}$th part of strong sulphuric acid. After three days the tincture was filtered from the root, and super-saturated with calcined magnesia. The liquid was then filtered, and sufficient sulphuric acid added to it to render it slightly acid. It was again filtered to remove the sulphate of magnesia formed. The filtrate was now mixed with twice its volume of distilled water, and the mixture evaporated to expel the alcohol, and to reduce considerably the bulk of the solution. To remove the soft resin which was separated by replacing the alcoholic menstruum with water, filtration was resorted to. The concentrated fluid was then carefully saturated with carbonate of potash, but nothing was precipitated. A large excess of that carbonate was now added, and the solution agitated for some time with four times its volume of ether, and afterwards set aside so that the ethereal part of the liquid might separate from the watery portion. When this separation had taken place, the ethereal portion was removed from the bottle by means of a pipette, and exposed to spontaneous evaporation in a capsule. Had an organic base been present in the root, it would have been found in the ethereal solution; but this solution was entirely free from any reaction on litmus paper. Thus far my experiments corroborate those of MM. Feneulle and Capron, as to the non-existence in black hellebore root of any body, having the more distinct characteristics of an alkaloid, but no farther. For I found in the ethereal solution by its evaporation, a well-defined *crystalline* organic body, to what I propose giving the name of *helleborine*, although that name has been already given to the soft resin by Gmelin, and undeservedly so, as I think: because it possesses no peculiarities either physical or chemical. This new body readily separates by evaporation from its watery, alcoholic, and ethereal solutions, in white translucent crystals. It is slightly soluble in water, more soluble in ether, and readily soluble in alcohol. It dissolves more freely in these liquids when they are heated. It is bitter to the taste, and produces on the tongue a tingling sensation like the

* *Journal de Pharmacie*, vol. vii., p. 502.

root. Strong sulphuric acid decomposes it, and gives with it a reddish-brown solution which, when diluted with water, affords a brown precipitate. Concentrated nitric acid dissolves it, but does not oxidize it until the solution has been exposed to heat. After it had been thus oxidized, the usual tests showed that oxalic acid was not one of the products. This substance is not volatile, and when heated, is decomposed, and leaves a carbonaceous residuum, but does not inflame. It is as previously indicated entirely without reaction on litmus paper, and does not combine with or saturate acids or alkalies. A dilute solution of caustic potash appears to produce no change in it, as is also the case with dilute mineral acids. It is not precipitated from its solutions by acetate of lead, bichloride of mercury, or iodide of potassium. When heated in a dry state with fused caustic potash in a tube, ammonia is evolved, which shows that it is a nitrogenous body. It therefore closely resembles piperine in many of its properties, which is classed amongst the alkaloids, although like helleborine it is devoid of alkaline reaction. But whether it possesses an elementary constitution similar to that of piperine, or the alkaloids in general, remains to be determined by ultimate analysis.

Having so far endeavoured to learn its characters, I proceeded to ascertain if this new body could not be extracted from black hellebore root by a more simple process. I treated the bruised root with alcohol to form a strong tincture. The filtered tincture was diluted with water, and heated for some time to expel the alcohol. The aqueous solution was then filtered to remove the separated resin, and afterwards further evaporated, when some helleborine crystallized out of the solution, but in a less pure condition than by the former process, consequently I treated the solution with carbonate of potash in excess, and agitated it with three or four times its volume of ether, which extracted the helleborine almost in a state of purity. This substance may be further purified by solution in alcohol and re-crystallization.

It is probable from this latter process that helleborine exists in an uncombined state in the root, and that it is the soft resin contained therein which chiefly interferes with its recognition and extraction, by a simple solvent as a crystalline substance. There is also a free acid in black hellebore root, which it is necessary to neutralize with a base before the helleborine is extracted from its aqueous solution with ether, as it contaminates the product. This is not gallic acid, which is said to exist in this root, according to the analysis of MM. Feneulle and Capron, as it did not give a black precipitate with a persalt of iron, but a brown gelatinous one; it also afforded white precipitates with acetate of lead and with nitrate of silver. Neither is it the volatile acid found by them, as it is not expelled by long boiling from its solutions. It seems to resemble closely the aconitic acid found in another member of the natural order Ranunculaceæ, especially when it is remembered, that like that acid, it is soluble when free in alcohol, ether and water.

It may be mentioned, that in consequence of the insolubility in ether of the colouring-matter extracted by alcohol from black hellebore root, it is scarcely necessary to use animal charcoal to decolourize the helleborine, as its ethereal solution is colourless in the above process, and this substance crystallizes thereout with care nearly in the same condition.

Mr. Stocken exhibited and explained his new plaster spatula, of which a drawing is given in the last number of this Journal.

PROVINCIAL TRANSACTIONS.

PHARMACEUTICAL MEETING—EDINBURGH.

The Edinburgh branch of the Pharmaceutical Society held their first Meeting for the winter season on Monday evening, in the rooms, 72, Princes Street—Mr. J. F. Macfarlan, Vice President of the Scottish branch, presiding. The attendance was large—the room being crowded; and the whole proceedings were of a very interesting character. Among those present were Dr. Wilson, Dr. Douglas Maclagan, Messrs. Gardner, Baildon, Robertson, R. Raimes, Flockhart, Mackay, Duns, Smith, Davenport, Brenner, Blanshard, Aitken, Shaw, Fairgrieve, Ainslie, &c. &c.

The Chairman then rose and said—I rise with pleasure to address you on this occasion, and to express my expectation that this the first meeting which we have held of a scientific character will prove the first of a series at once interesting and instructive—interesting in regard to the matters which may be brought before us, and in regard to the manner in which these may be handled, and instructive in regard to the information communicated, the illustrations with which the information may be accompanied and the clearness and precision with which it is expressed. I shall assume that you are all sufficiently acquainted with the fact that the Pharmaceutical Society, for some years sanctioned by Royal Charter, has now had that Charter confirmed by Act of Parliament, and I therefore shall not waste your time with any details on the subject; suffice it to say, that it was to the unwearied perseverance, the untiring energy, the indomitable firmness of Mr. Jacob Bell, that we are indebted for the passing of that Act under which we have now assembled for the first time as a corporation, sanctioned by the Legislature of the country. We are also indebted in no ordinary degree as a body, to Dr. Wilson, Sen., Physician to St. George's Hospital, London, Mr. South, President of the Royal College of Surgeons there, for the manner in which they supported our cause, and also to Dr. Douglas Maclagan, of this city, whose testimony in favour of the Society might well outweigh, as it did outweigh, a host of testimony of an opposite character. I might advert also to the steady and honourable support which has always been afforded by Professor Christison, whose absence this evening we must all much regret. I might also advert to Dr. Wilson, and others of a kindred spirit, whose kindness and support cannot fail to encourage and aid us in the path on which we have entered. It has been asked by some, What benefit is this Act, so meagre in their views, to confer upon the Chemists and Druggists of the country? To this I would answer, first, it has incorporated into one body, under the authority of the Legislature, those who were disunited before, those who had no common bond of union. Isolated in their position, they had no sympathy with one another. Like the Ishmaelites of old every one's hand was against his fellows and they against him. The Act, however, has given them a bond of union, and, by uniting them into one body, it has given them a common interest, and, at the same time, a higher standing. It has placed them on such a footing that if one Member suffer, all will suffer with him. If one Member be aggrieved, all may be called upon to aid in removing the cause of injury, or, if they cannot do so, at least they will be able to alleviate and sustain. In such a body, raised by the Act of the Legislature to the dignity of a corporation, the selfishness of individual interests, the mean jealousy which, alas, has too often characterised the conduct of individuals, the underhand efforts to supplant their neighbours and to obtain their business, not by the fair and honourable competition which ought ever to prevail, but by making insinuations and holding out inducements unworthy of men even in an isolated condition. These and such as these can find no place, no standing ground, in a body united together by such a tie. Men acting together as members of such a corporation cannot descend so low, or be influenced by motives such as these. To accomplish such an object—to unite together in bonds of friendship, or at least of harmonious co-operation—is no mean achievement, and, if this be accomplished by the passing of this Act, it will not have been passed in vain. But the Act has given us a higher standing ground. The interest of the Chemist and Druggist can no longer be overlooked in any Act which may be passed for regulating the medical profession. And if we do occupy a higher standing ground in this respect, shall we not seek to occupy a higher standing-ground in regard to the qualifications required of those who would worthily maintain it. Our present position demands that we should not be satisfied with present attainments.

The present is not a day in which, in any department, one may lay the flattering unction to his soul that he has attained,—that he is already perfect. Look to Chemistry—what was it a few years ago?—what is it now? A science pervading every branch of human knowledge; guiding the farmer in his husbandry, the mechanic in the choice of his materials, the housewife in her culinary operations, and every man, more or less, in everything in which he is engaged—so great, so rapid, so wonderful is its progress, that, let the most learned of the Pharmaceutical Chemists of the present day rest contented with his present acquirements, and he will soon be left far behind even the youngest of his pupils. It is so in Chemistry, and is it less so in Pharmacy? Can the man who would undertake the duty of a Pharmaceutical Chemist afford to be ignorant? Yes, say some. If he knows but enough to weigh up a powder, to measure out a liquid, to mix up an ointment, that will do. Should he know more he will intrude on our province, he will prescribe, he will become a medical man—*Risum teneatis amici.* Will a man weigh a powder less carefully, that he knows of what that powder is composed? Will he measure out the liquid with less exactness if he can tell the contents of that liquid, and be able to explain the chemical action which may take place when the different ingredients of the prescription are mixed together? Or will he mix the ointment with less care that he is able to distinguish strychnine from bismuth. The idea is absurd. It is founded on a mistake. I would say that the best-educated man among you will be the first to advise those who may ask his aid to call in the regular physician; for he will best know the danger of delay, and will be least inclined to take upon himself the responsibility of prescribing when he is aware that life or death may be the issue. The requirements of the present day are such that nothing less than the highest attainments will suffice. "A little learning is a dangerous thing." A half-fledged Pharmaceutical Chemist may do mischief—a well-informed, a well-educated one may and will do good. It is impossible for such a man to be too well informed. Sure I am, that every intelligent physician would rejoice were he assured that, wherever his prescriptions were sent, they would be carefully prepared: he would then be relieved from all anxiety, for he would know that what he had ordered would be administered, and that thus the patient would receive the full benefit of his matured experience.

"Pharmacy," says Dr. Renodæus, Chief Physician to the King of France, "is not so requisite in a Philosopher as an Apothecary, whose sole work is to prepare medicines for the Physician's administration, either in preserving or procuring health, for in his hands consists health and sickness, life and death; and he hath free power in the composure of his physic, not only to obstruct the current of health, but also to deprive us of life, when he is wickedly bent thereunto, either out of malice or ignorance, so that if Hippocrates be honest and upright, it is no matter if Socrates be a knave.

"But first of all, an Apothecary ought to be a lover of piety, one that fears God, void of envy and malice, of a sound judgment, well skilled in grammar, of a good competency, not covetous, patient of labour, of great industry, not given to corpulency and epicurism, one that makes conscience of his actions: for an Atheist, as he doth not respect the Creator, so neither the creature; and an envious man repines at another's man's good, and a foolish man hath an inseparable property in him, viz., a desire to hurt; and the unskilful thinks nothing right but what he doth himself, and the covetous man is good to none, worst to himself; and a poor man is easily corrupted, for need will compel him to deal dishonestly*."

But I must hasten to a close. I need not point out the advantages which each Member of this body will confer upon the rest by communicating in papers (which we would gladly receive) longer or shorter details of his experience: for there is no one so little versed in practical details that he may not furnish something valuable to the body at large. I will only say that, to the intelligence, the zeal, the industry, and public spirit of the Members, the Association looks, and I trust will not look in vain, for redeeming the profession from the low and degraded state in which it has hitherto been, and elevating it to that high position which it has long occupied on the continent, and which it ought to have occupied long ago in this free and happy land and enlightened age; so that should the variegated colours which have hitherto embellished the windows of the laboratory, and formed the emblem of his calling, be

* Renodæus' Dispensatory. Translated by R. Tomlinson, Apothecary, London, 1657.

still continued, they may at least mark, that whether the occupant be poor or rich, successful or unsuccessful, he is at least an intelligent and honest man, who, if he has not been able to command success, has done more—he has by his labours deserved it, while, by his upright character, he adorned the profession to which he belongs, and secured the esteem of all who knew him.

Professor Christison having been expected to address the Meeting, the Secretary read the following letter, explanatory of the Professor's absence:—

"*Moray Place, 25th October*, 1852.

"My dear Sir,—I have been contending all forenoon with a shivering and other seeds of what appears to be an influenza, but have put off till the last hour pleading this as my apology for non-appearance at the Pharmaceutical Society, in the hope that I might not be incapacitated from duty. I now find, however, that I cannot prudently go out this evening, more especially as our University Session is near at hand, and I have a great dread of being laid up, as I had the ill luck to be last year at the same period.

"I assure you that I regret this very much, not because I had anything to say particularly worthy of the Society's notice, but because I was anxious, by my presence, and by what I should have said, to convince the Society of the very sincere interest I take in its prosperity and proceedings.

"I trust very soon to be able to contribute more useful matter to its proceedings, however, than an opening address.

"I regret that, in consequence of more professional occupation than I had counted on, I was unable to look out some specimens which I had intended to present to the Meeting. In the department of ordinary drugs, I, of course, can be of little or no service to your Museum. But in the natural history of drugs in general, and in the Materia Medica of foreign countries, I may be able to contribute from time to time specimens equally interesting and difficult to procure. I have already several duplicates of this kind, such as the different East India opiums, Borneo camphor, true quassia, &c., which, if the Society will allow me, I shall take care to present at its next meeting.

"I beg you will assure the Society of my great regret that I cannot be present on the Inauguration-day; and that I shall be glad to contribute everything in my power to promote its objects and its prosperity.

"I am, yours sincerely,

"*John Mackay, Esq.* "R. Christison."

The Chairman then moved a vote of thanks to Professor Christison, for the kind and earnest manner in which he had expressed himself regarding the advancement and prosperity of the Pharmaceutical Society, and for the Professor's promise of donations to the Museum, which was most cordially and unanimously assented to, and the Secretary requested to communicate the same to Professor Christison.

ON SOME OF THE MORE IMPORTANT CHEMICAL DISINFECTANTS.

BY GEORGE WILSON, M.D., F.R.S.E.,
Hon. Member of the Pharmaceutical Society of Great Britain.

I consider it an acknowledgment due from me to the Pharmaceutical Society of Great Britain, which has honoured me with its diploma, that I should contribute a paper to the proceedings of its Edinburgh section, with which I stand more immediately connected. I have selected a subject, of special interest at the present moment, when we have reason to apprehend the appearance of cholera on our shores, but which is at all times a subject not less important than it is difficult. To discuss the entire question of disinfection would require many papers. I can only refer at present to some of its relations.

The term *disinfectant*, in strictness of language, can only be applied to those agents or substances which destroy or decompose infectious or contagious matter. But it is usually employed in a wider sense, so as to include not only *disinfectants proper*, but likewise *antiseptics* and *deodorisers*. Any attempt to draw a sharp line of demarcation between these three classes of agents, is rendered impossible by our almost total ignorance of the nature of contagious matter. Some substances, such as chlorine and sulphurous acid, possess at the same time, disinfectant, antiseptic, and deodorising powers. Some, like common salt, are probably simply antiseptic,

of others, such as the salts of the heavy metals, which are in high repute as deodorisers, it may be questioned whether they are of any value as disinfectants, although with some persons they rank at the head of the list. Without insisting, at present on this, it may suffice to define the bodies we are about to consider, thus: A Disinfectant is an agent which effects the chemical decomposition of organic poisonous matter—the term poisonous being used in a wide sense to include all the known or supposed causes of the development of disease, which are referred to under the names of miasma, malaria, infectious virus, contagious matter, &c.

An antiseptic is an agent which prevents or arrests the development of organic poisonous (or non-poisonous matter) without effecting its chemical decomposition.

A deoloriser is a substance which destroys odour, by decomposing or combining with, or absorbing odorous matter. Chlorine, for example, decomposes sulphuretted hydrogen, whilst a salt of lead decomposes it, and charcoal simply absorbs it.

Before considering the relative merits of particular substances belonging to these classes, it is necessary, however, briefly to discuss the important question—does the poisonous organic matter which occasions certain diseases, occur in the solid, liquid, or gaseous form? The certainty that prolonged exposure to a vitiated atmosphere, such, for example, as that of a fever ward, produces disease, has led to a conclusion in which probably all concur, that the air is one of the chief media through which disease is propagated, and this connection has in turn led to the much more doubtful inference that infectious matter is truly gaseous or vaporous. This view has probably been strengthened by the recent extensive study of the properties of anæsthetics, and by the many observations which have been made on the rapid and powerful action on the body of substances which enter it through the lungs. It has certainly also been deepened by the opinion, widely prevalent, that the gases which are evolved from cesspools, sewers, and stagnant waters in general, particularly sulphuretted hydrogen, hydrosulphuret of ammonia, and marsh gas (light carburetted hydrogen) are the *direct* and *specific* causes of ague and fever.

If this opinion were well founded, the limits and best modes of applying disinfectants could be determined without much difficulty, and our controul over infectious diseases would certainly be much greater than it is.

I think, however, that we may with confidence affirm that the great majority of diseases are not propagated by gaseous poisons. The recent tendency to advocate an opposite opinion, has been mainly occasioned, I believe, by an opinion expressed by the late Professor Daniell to the effect that the fatal fever of the African coast is occasioned by sulphuretted hydrogen. This view was founded on an analysis of water brought from that coast, and determined the ventilating arrangements fitted up in the vessels which formed the disastrous Niger Expedition. It appears to have been extensively adopted by medical men.

During the frequent prosecutions for nuisance, under the New Police Act, which took place in this city and elsewhere, during the last visitation of cholera, it occurred to me, and to other Chemists, to be constantly met by endeavours on the part of the prosecutor to compel an acknowledgement that sulphuretted hydrogen, hydrosulphuret of ammonia, and marsh gas or light carburetted hydrogen, which are confessedly given off by sewage waters, are the *direct* causes of fevers and other diseases. So long as this idea prevails, and men rest satisfied with it, as the true explanation of the mode in which fevers and similar maladies originate and are disseminated, they will cease to prosecute inquiry into the matter. It is most important, therefore, to discountenance the notion that we are acquainted with the true *materies morbi*.

That neither sulphuretted hydrogen nor hydrosulphuret of ammonia produces any special disease, may be sufficiently demonstrated by the impunity with which persons are known to expose themselves to much larger quantities of these gases than can possibly act on those who suffer from exposure to marsh miasmata. In these, the nicest tests have failed to give the slightest indications of sulphuretted hydrogen, and yet a few hours' exposure to such miasms has been enough to develope fever. On the other hand, in every analytical laboratory, sulphuretted hydrogen and hydrosulphuret of ammonia are daily respired for weeks or months together by those engaged in analysis, yet analytical Chemists certainly are not specially subject to fevers. At the Bonnington Chemical Works, where the ammoniacal liquor from the Edinburgh Gas Works is largely converted into sulphate and muriate of ammonia, the workmen are exposed to the hydrosulphuret of ammonia which forms so considerable a part of the liquor, and when it is neutralized with sulphuric and muriatic

acid, sulphuretted hydrogen is given off in such abundance as to blacken the silver coins and watches on the persons of the bystanders, and even (along with the carbonic acid simultaneously evolved) to render them temporarily insensible if they incautiously respire the gases. Yet no special malady is known to result from this exposure, and the Bonnington Works enjoy the reputation in the neighbourhood of protecting it from the inroads of endemic and epidemic diseases. Similar observations as to the non-deleterious effects of exposure to comparatively large volumes of sulphuretted hydrogen have been made at the metal works, where a superficial tarnish of metallic sulphuret is removed by washing with acids, and the workmen are freely exposed to the sulphuretted hydrogen evolved. I need not say, that I do not wish to affirm that this gas or its combination with ammonia, is not a powerful poison, if respired alone, or to deny that the continued entrance of either into the body, must debilitate it and prepare it for yielding to the attacks of disease. But that it is the cause of the fevers, which a very short exposure to the so-called malaria of certain districts infallibly occasions, I altogether disbelieve.

The alleged noxiousness of diluted marsh gas (light carburetted hydrogen), admits of more easy disproof, for were it the deadly agent it has been declared to be, our colliers who are exposed in coal-pits to much larger volumes of it than any other class of persons, should be to a corresponding extent sufferers from the diseases which it is supposed to occasion; but, unless when its mixture with air explodes, it is destitute of any injurious action on the pitmen, who are a healthy class of the community.

Another disease, namely influenza, has been imputed by high chemical authorities to the diffusion through the atmosphere of a peculiar gas. Dr. Prout regarding seleniuretted hydrogen as its cause, Schœnbein attributing its production to ozone. There is no evidence that either of these views is true, but much may be said in favour of the latter. The last severe epidemic of influenza spread over Europe with a rapidity which almost seems to point to a gas as the medium of its propagation. No one, however, has detected seleniuretted hydrogen in the atmosphere; and air largely impregnated with ozone, may be breathed with an impunity which throws grave difficulties in the way of Schœnbein's hypothesis.

Whilst thus, with the exception of influenza (if it is to be excepted), no gas is known to possess the power of developing an infectious or contagious endemic or epidemic; on the other hand, as Prof. Graham has justly remarked, such infectious matters as are accessible to us; for example, "the matter of cow-pox may be dried in the air, and is not in the least degree volatile. Indeed, the volatility of a body implies a certain simplicity of constitution and limit to the number of atoms in its integrant particle, which true organic bodies appear not to possess. Again, the source of such bodies being at all times inconsiderable, they would, if vapours be liable to a speedy attenuation by diffusion so great as to render their action wholly inconceivable. It is more probable that matters of contagion are highly-organized particles of fixed matter, which may find its way into the atmosphere, notwithstanding, like the pollen of flowers, and remain for a time suspended in it."*

To these statements it may be added, that all Chemists now acknowledge that volatility is not essential to the transference of solid bodies to the atmosphere, at least so far as those soluble in water are concerned; for observations on the largest scale have shown that the vapours of volatile liquids carry with them sensible quantities of all the solids which they dissolve; common salt, nitrate of potass, boracic acid, phosphoric acid, afford marked examples of this; but the list of salts soluble in water which accompany its vapour at temperatures at which when dry they are fixed, is endless.† The significant word "*Malaria*," therefore, which embodies in a single term, the evil reputation which the air or atmosphere has acquired, as the vehicle of contagion, may still, if we choose, be retained, although we acknowledge that all accessible contagious matters are non-volatile liquids or solids. It may further be added, that with the questionable exception of influenza, no endemic or epidemic spreads with the rapidity and equability, so far as area of occurrence is concerned, which would characterize it, if it were occasioned by a gas

* *Elements of Chemistry*, p. 336.

† In virtue of this we may anticipate the administration of other medicines than anæsthetics by the lungs, although they may not be volatile. In cases of poisoning it would be of the greatest importance, if we could directly transfer to the blood an emetic or purgative, which we may hope to do along with the vapour of its solvent, aqueous or non-aqueous. Such a process, however, would be applicable only to medicines which act powerfully in small doses.

subject to a force so powerful as that of gaseous diffusion. Professor Graham's argument is still more cogent, for, according to his views, if infectious matters were truly gaseous we should never have endemics or epidemics, unless those matters were developed in immensely larger quantities than by universal acknowledgment they are. In truth, they elude every test, even when applied to large volumes of the most infected atmospheres.

From all that has been stated, it must be inferred, according to our present knowledge, that at least the great majority of the substances which are intended to be reached by disinfectants, are not volatile, and therefore are much less easily decomposed than if they were gases. We may also with reasonable confidence affirm, that they are organic products, and as such consist of carbon, hydrogen, oxygen, and nitrogen, or at least of two (if not always of three) of these elements; and that like all such compounds, they are readily decomposed by chemical reagents, especially oxidizing ones. There is no reason to imagine that infectious matters are difficult to decompose, *provided we can reach them*. The difficulty lies in reaching them. Assuming then that contagious matters are not volatile, and that they contain (to take the most complex case) carbon, hydrogen, oxygen, and nitrogen, the principles which are to guide us in the application of chemical disinfectants, will not be far to seek. Oxidizing agents will plainly be of great value, as they can readily convert hydrogen into water, and carbon into carbonic acid, and thus disintegrate and destroy the morbific matter. Substances having a great affinity for hydrogen, such as chlorine and its class, will plainly also be of great service. Substances having an affinity for oxygen will also be applicable to the destruction of organic poisons; and, finally, all reagents which by contact with organic matter can determine a new arrangement of its ultimate elements. All the powerful chemical disinfectants act in one or other or all of those ways. I shall refer to five of the disinfectants: 1, quicklime, including caustic potash and soda; 2, nitric acid; 3, chlorine; 4, aqua regia; 5, ozone. The value of *quicklime* and of the *caustic alkalis* as disinfectants, has certainly not been overrated, although it may be questioned whether our sanitary authorities have been wise in trusting to lime alone as a purifier. From the careful study of the process of natural and artificial nitrification, and from the results of the application of soda-lime in organic analysis, we have learned that the caustic alkalies and alkaline earths decompose organic matter with the evolution of ammonia, which by oxidation may become converted into nitric acid. Woodwork or stone-floors, to which a coating of limewash cannot be applied, requires only to be washed with caustic soda or soft soap, to obtain an effect identical with that which lime occasions.

2. *Nitric Acid* seems latterly to have fallen into disrepute, but certainly undeservedly. It acts more rapidly on many organic compounds than chlorine does, attacking their carbon as well as their hydrogen, and as it is not required in large quantity its application is not costly.

3. *Chlorine.*—Of chlorine, which is at present the favourite disinfectant, it is needless to speak. Its peculiar power of decomposing combinations of hydrogen, gives it, in one respect, a superiority over nitric acid, which does not decompose many of the gaseous hydro-carbons; but it should not be forgotten that it is only in the presence of light that this action of chlorine is fully displayed, so that its disinfectant influence is comparatively small in the case of dark or ill-lighted apartments, such as underground cellars, the lower cabins, or the hold of a ship, which are the very places where disinfectants are often most wanted.

4. *Aqua Regia*, as uniting the properties of nitric acid and of chlorine; each of which has peculiar virtues, the former in particular being a powerful oxidizing agent, the latter possessed of a great decomposing action over hydro-carbons, appears entitled to a high place among disinfectants. It can be cheaply procured by pouring oil of vitriol on a mixture of nitre and common salt, or by heating a mixture of nitric and muriatic acids.

One of the most rapid and effectual methods of disinfecting a large empty apartment such as an hospital ward, would be to place in one corner a vessel containing the materials for chlorine, such as oxide of manganese and hydrochloric acid, or oxide of manganese, common salt, and oil of vitriol; and in another corner a vessel containing nitric acid and a few fragments of copper, so as to evolve nitric oxide, which would spread through the apartment and form nitrous acid there, oxidizing everything oxidable which it contained, whilst the chlorine specially attacked the hydrogenous compounds. The walls might then, if necessary, be lime-washed, with a view

alike to destroy any adhering organic matter which had resisted the action of the gases, and to neutralise any traces of free acid.

5. The last of the disinfectants proper to which I refer is the singular substance ozone, which has a special interest, as being in all probability the great natural disinfectant. Its nature is still matter of speculation. Schœnbein, its discoverer, regards it as a peculiar oxide of hydrogen; Berzelius and Faraday represent it as simply oxygen in a peculiar (or allotropic) state of modification; it has been suggested that it is an oxide of nitrogen; and quite recently M. Fremy has affirmed it to be what he calls "electrised oxygen," *i. e.* oxygen modified in properties by the action of electricity upon it; a view not materially differing from that of Berzelius and Faraday. There are difficulties in the way of all these views, into which it is not necessary to enter. All that concerns our present subject is that, by different processes a substance can be developed in the atmosphere which possesses remarkable disinfectant and oxidizing properties. The oldest known method of producing the so-called ozone, is the exposure of air to a stream of friction or high tension electricity. Its odour may always be recognized in the neighbourhood of an electrical machine whilst at work. Another method is the galvanic decomposition of water, when the ozone accompanies the evolved oxygen. A third, and the most convenient method on the small scale is the exposure of phosphorus in moist air. By these processes and by certain others, air is made to acquire a striking power of oxidizing, bleaching, deodorizing, and disinfecting. We cannot doubt that every thunder-storm developes some ozone, and other processes also probably produce it. At all events the atmosphere frequently exhibits an oxidizing and bleaching power, at other times absent, which Schœnbein, Faraday, and others, attribute to the development of ozone within it.

No one who has experimented on ozone will doubt its potency. I refer to it here because there are so many reasons for believing that it is the agent which prevents the accumulation in the atmosphere of volatile organic bodies, by converting them into water, carbonic acid, nitric acid, and ammonia, that we cannot avoid looking hopefully to it as destined to prove our disinfectant *par excellence*. Certain as we are that for thousands of years miasmata, malaria, poisonous effluvia, and every gas, vapour, and volatile body developed at the surface of the earth, must have found their way into the atmosphere, and that nevertheless its purity is not sensibly affected, we must regard the constituent or condition of the air, which has secured its purity during centuries, as one demanding special study. Further, this constant process of disinfection has not interfered with the respiration of animals, so that we may fairly regard ozone as a substance applicable as a disinfectant in places occupied by human beings or by the lower animals. It is true that the power of producing influenza or catarrh has been attributed to ozone in excess; on grounds, however, almost entirely speculative. This view may or may not be true; but of this I am quite certain, that the well known impunity with which electricians expose themselves for hours together to the action on the atmosphere of large friction machines, which the dullest nostril can discover to be producing abundance of ozone, is enough to show that a large impregnation of the air with this substance, neither affects respiration nor produces catarrhal affections. We ought, therefore, I think to give special attention to ozone. It is not likely that we shall be long without discovering new processes for its production. It will be specially valuable for what are the most important, and, at the same time, the most difficult occasions for disinfection, namely, where human beings cannot be removed from infected apartments. Examples of such cases are found in a large ship at all times, and still more when its crew and passengers are attacked by disease; in the wards of an hospital, from which the sick cannot be taken; and perhaps most strikingly in a large factory, where hundreds of persons assemble daily together, many of most uncleanly habits, and at epidemic seasons fresh from infected rooms, whilst the apartments contain valuable metallic machinery, and fragile silk, cotton, linen, or woollen goods, which interpose an additional obstacle to the free employment of gaseous disinfectants. The condition of our ships as regards ventilation and wholesomeness is proverbial; and on inquiry of residents in Manchester and Glasgow I find, that where disinfection has been attempted in factories—which it rarely has—it has consisted in sending a man once a day through every room with a quantity of blazing pitch, which was supposed to fumigate into purity the atmosphere, whilst it set all the workpeople coughing.

How difficult it is to prevent the spread of erysipelas, gangrene, fever, and the like in hospitals, every medical man knows too well. Ozone at least deserves a trial as a disinfectant in such cases.

Antiseptics.—The only antiseptics to which I shall refer are two. The first is sulphurous acid: it is a powerful antiseptic, for it resists thoroughly the decomposition or decay of organic matter. In reality, however, it as much resists the development as the decay of organic bodies, and thus it doubly prevents the evolution of organic poisons. Dr. Christison long ago pointed out how small a quantity of this acid is sufficient to destroy plants. In the wine countries it has been used from time immemorial to prevent the souring or acetification of the lighter wines, when kept in casks partially filled. Professor Graham, who strongly recommends it as a disinfectant, draws attention to the fact that at Manchester the offensive effluvia of the cochineal dye-vats, which resist the action of chlorine and nitric acid, are at once destroyed by sulphurous acid. My own attention was directed to it from the employment of it on a large scale by paper-makers and others to secure the preparation of pure gelatine, a substance peculiarly liable to enter into putrefaction. Sulphurous acid can be easily prepared by burning sulphur, or by heating oil of vitriol, along with charcoal, or vegetable matter. Its corrosive action is very slight; its disinfecting action very powerful. The sulphite of soda is now prepared in quantity at different Chemical works. The addition of a stronger acid sets free the sulphurous from its salts. As to its mode of action, if we concur with Liebig in believing that morbific matters resemble ferments in being active, only whilst undergoing a decomposition which is mainly determined by the oxygen of the air, we may suppose sulphurous acid to render the poisonous matter inert, by preventing its oxidation. This acid, moreover, is a powerful deoxidizing agent, and it may be by removing oxygen from organic poisons, that it renders them inert, by decomposing them.

Further, sulphurous acid can combine with certain elements of organic bodies, as we see in its temporary bleaching action on vegetable colours; and it may be thus that it neutralizes morbific matters. In one or other or all of those modes, this agent may act as a disinfectant; but at all events its action is very powerful, and it deserves much more attention than it has received.

The only other substance to which I shall at present refer, is pitch oil, one of the products of the distillation of tar. It is an antiseptic of the most powerful class, and very cheap, and if not used in excess it is applicable as a deodorizer, but its own strong tarry smell interferes with its extensive use.

A FEW REMARKS ON THE PREPARATION OF SYRUPUS PAPAVERIS.

Read at the Pharmaceutical Meeting, Edinburgh, October 25, 1852.

BY MESSRS. T. AND H. SMITH.

The syrup of poppies has always proved a very unsatisfactory preparation in our hands. It may be ranked among that class of drugs and preparations which, although in their own nature, may be intrinsically good, yet, from various causes, involving variations in strength, defectiveness in those characters which give them their value, or the addition of others rendering them actually hurtful—a tendency to enter into fermentation or decomposition in some other form; from one or more such or similar causes, have unhappily come to be looked upon with distrust, and even to be entirely discarded as remedies in the practice of judicious and cautious practitioners. The lenitive electuary, scammony and its preparations, chloroform, and a remedy more recently come into notice, glycerine, may be named as examples. It is not difficult to understand how these evils may originate. The formulæ for their preparation may be bad—may be misinterpreted or carelessly followed out; but perhaps the chief cause above all, is to be traced to that morbid desire to beat down prices to such a point, that it actually comes to be almost beyond the range of possibility to obtain the pure article.

Glycerine forms as striking an instance as any that could be named of the risk of a medicine in itself truly valuable, losing its well-deserved credit from the quantity of worthless stuff sold under that name. Glycerine is essentially emollient in its character, and, in its numerous remedial applications it is assumed to be so. This is far from being true of the greater part of what is to be found in the market. The cause of this will be easily understood. In saponifying fatty matters, if these were constituted of nothing else than the fixed fatty acids, such as margaric, stearic, and oleic, and glycerine, the latter substance could be easily obtained pure and mild

in its nature; but it must be recollected that there are very few fats that do not contain more or less of certain acrid and volatile acids, such as butyric, valerianic, acetic, &c., and when by saponification the intimate connection of the fatty constituents is broken up, all these acrid matters are left behind in the glycerine. And as glycerine is mostly obtained as a by-product, and seldom from fresh and sweet fatty matters, it need not excite surprise, if no means be used to remove these acrid substances, that the glycerine should be harsh in the extreme.*

The unhappy result of the whole matter is this, that in place of a remedy mild, soothing, and salutary in its nature, glycerine is found to be too often irritating, and even injurious, in its effects.

With respect to the syrup of poppies, the more immediate object of these remarks, the formula seems to be faulty in at least two important circumstances. The infusion with which the syrup is made, contains substances eminently unstable in their nature, and apparently no way conducive to the medicinal value of the preparation, such as albumen and mucilaginous matters. Again, the quantity of sugar is not only inefficient to prevent these substances undergoing changes, but in all probability, rather accelerates these, by supplying additional matter to act upon. The remedy offered by us to obviate these evils, is such a mode of preparing the syrup as shall exclude, as far as possible, these objectionable bodies, without interfering with the activity or characteristic action of the preparation, and permit of a larger proportion of sugar being used.

Eighteen ounces of poppy-heads are exhausted by maceration or percolation with water, at a heat of about 120°, and a soft extract is formed by evaporating the liquid by means of a steam or water-bath. The watery extract is now to be carefully worked up with repeated portions of rectified spirit, till the strength is fully dissolved out, and then, after filtration, and recovering most part of the spirit by distillation, and complete expulsion of the remainder, at a water-bath heat, a watery solution is to be formed of the soft spirituous extract. This solution is to be filtered, thus separating a quantity of insoluble matter consisting apparently of resin, colouring-matter, and earthy salts, &c. The measure of the liquid is brought to 33 fluid ounces, either by the addition of water or by evaporation, as may be, and made into a syrup, by dissolving in it, in coarse powder, 60 troy ounces of refined sugar.† The syrup when prepared should measure 76 fluid ounces, if not, it should be brought to this measure by the addition of water. The quantity of 76 ounces is what the Edinburgh College formula should give, and the proportions have therefore been framed so as to produce a quantity exactly the same.

In the first part of this process the watery solution will agree in its nature with that of the Pharmacopœia, but in a subsequent stage, while the spirit takes up all the active constituents of the watery extract, mucilaginous and albuminous matters in considerable bulk are left behind in consequence of their insolubility in this menstruum.

On comparing the quantity of sugar in the official formula—which, strangely enough, is only 14½ Troy ounces to 20 fluid ounces of liquid, while the proportion in syrupus aurantii is 36 to 20—with the quantity given here, it will be found that the former contains in 76 fluid ounces of syrup only 36 troy ounces, whereas the latter in the same measure contains as much as 60 troy ounces, or nearly double, without being at all in excess. The one may be viewed as a mucilaginous extract, with the addition of some sugar, while the other answers to the character of what it professes to be, a real syrup; and may, therefore, be reasonably expected to keep as well as the generality of syrups do.

That it will keep under all circumstances, we do not pretend to affirm, but so far as our experience goes, which extends to nearly a year, no fault can be found to it in this respect. The mere addition of sugar, however, to the ordinary syrup of poppies will not make it more stable; of this we are assured by Mons. Soubeiran, as the result of his own experience. But by excluding those substances which occasion fermentation, and supplying their place by a larger proportion of sugar, both a much more elegant and permanent preparation is obtained, while from our personal experience we can affirm that its strength is not deficient.

The only similar process we know of to the one proposed is that of the Paris Codex, which orders the syrup to be prepared from the spirituous extract of poppies. We have at any rate, two objections to this formula. In the first place, the formation of a spirituous extract directly from so bulky and spongy a substance as poppy heads, cannot be entertained in this country, where spirits of wine is so expensive; and the second, equally serious objection, is the great difficulty of dissolving out with water the active ingredients from a firm resinous extract. From this circumstance we should fear there is much danger of inequality in the strength of the resulting syrup. These objections, are, however, removed by following the process here given; and by exhausting the capsules completely, a syrup is obtained of uniform strength: a most important object in such a preparation.

* About three ounces of these volatile acids were exhibited to the Meeting, which had been taken from one gallon of commercial glycerine, as also a small portion of butyric æther prepared from the same liquid.

† These proportions giving a solution near the point of saturation, and possibly, therefore, in cold weather causing a slight crystallisation, can easily be modified to prevent this, when desirable, without affecting the strength of the preparation.

LIVERPOOL CHEMISTS' ASSOCIATION.

29th October, 1852.

MR. SUMNER, PRESIDENT, IN THE CHAIR.

Dr. J. B. Edwards delivered a lecture on "Galvanic Apparatus," (the publication of which is deferred, as it requires illustration by woodcuts, which could not be completed in time for this number of the Journal.)

After the conclusion of the lecture, Mr. Muncer exhibited a specimen of cinnabar from California, the first, he believed, which had arrived in the port of Liverpool from that country; also specimens of bottles made from bamboo, in which quicksilver is imported from China.—(See Pharm. Journ., vol. iii., page 532.)

12th November, 1852.

MR. SUMNER, PRESIDENT, IN THE CHAIR.

The President said that the business of the evening was to hear a lecture by Mr. H. S. Evans, on the "Pharmacy of Rhubarb," and to consider the subject of the supply of medicines to emigrant ships. With a view to the latter business, the trade generally had been invited to be present, and the Society would be glad to hear their opinions upon it. He then shortly related the leading facts, with which the readers of the Journal are already familiar, and noticed the probability that the monopoly which at present was confined to the supply of medicines for ships chartered by her Majesty's Commissioners would, unless a remedy for the evils in which it originated were found, be extended to all classes of emigrant ships.

A discussion ensued at some length. Mr. Coupland observed that there were medical officers appointed to examine passengers' chests, and they were considered competent to examine for all but those sent out by Government. He forcibly pointed out the inconsistency of this, and said it was strange that ships could be supplied at Liverpool with everything but medicines.

Mr. Abraham read a draft of a Memorial which the Council of the Liverpool Chemists' Association had prepared to send to the Commissioners, expressing their opinion that a competent inspector, provided with suitable means of examination at a depôt, could protect the interests of emigrants even more effectually than the interests of the public are now protected, and that such an arrangement, applied to all classes of emigrant ships, would be more beneficial and more just than the present system.

On the motion of Dr. Edwards, seconded by Mr. Shaw, it was unanimously resolved that the Council of the Association be requested to send a deputation to present the Memorial to her Majesty's Land and Emigration Commissioners.

Mr. H. Sugden Evans, F.C.S., then delivered a

LECTURE ON THE PHARMACY OF RHUBARB,

Of which the following is an abstract.

Mr. Evans opened his subject by defining pharmacy to be a science or knowledge of certain natural laws, whereby we may controul the reactions of medicines, and an art or practical application of those laws to the collecting, preserving, preparing, and compounding of medicines. Rhubarb has been more frequently studied than

most other remedial agents, yet its history and origin are veiled in obscurity, nor can the true plant yielding it be ascertained; and we shall probably remain in this ignorance until access is gained to the Tartar and Bucharian territories. Whatever the species, the plant yielding the rhubarb is a Rheum, belonging to the natural order Polygonaceæ, a class of herbaceous plants, found abundantly in most parts of the world.

Various species of Rheum have from time to time been declared to be the true species, but all the endeavours of scientific observers, and even the influence of the Russian Government itself, have alike failed in gaining the truth, and all the seeds and information which have been obtained are false. Such is the jealousy with which the Tartars and all connected with Chinese rule look upon the slightest inquiries, that the utmost care is taken to thwart all attempts at gaining information. Indeed, the density of the mists in which these "celestial" beings delight to wrap all that concerns them is such, that the progress of civilization has been materially checked amongst a nation whose natural resources are superior to any, and it has been impossible to gain any information worthy of credit.

Mr. E. then described the varieties of rhubarb met with in the markets, which he classed as Russian, China, and European, with a fourth, Himalayan, the produce chiefly of the Rheum emodi, a species growing extensively on the Himalayan Mountains, at altitudes of from 9000 to 10,000 feet. There is a fine specimen of this species in the Botanic Gardens here, every portion of which possesses purgative properties.

The Russian rhubarb is supplied by virtue of a contract existing between the Russian crown and Bucharians, whereby these latter are required to supply a certain quantity of fine root annually, and forfeit all that is rejected, which is accordingly burned. The examination to which the crown rhubarb is subjected is excessively rigid, and hence its superior quality.

There are two kinds of China rhubarb, the ordinary East Indian and the Dutch trimmed, or an imitation, but very clumsy one, of Russian.

Rhubarb is cultivated to a small extent in this country, but on the Continent its culture is rather extensive.

The roots are gathered in the autumn, when they contain the largest amount of the peculiar principles of the plant. British rhubarb is but little used except for cattle medicine, or by some unprincipled persons as a substitute for or mixed with the Russian powder as a medicine. This has excited a natural desire to know wherein its properties reside, and hence many analyses have been made.

Rhubarb contains about fifteen per cent. of bitter extractive matter peculiar to itself, soluble in alcohol, hot, and cold water, having an alkaline reaction, and possessing all the flavour, but not the odour of the root. It owes its colour chiefly to chrysophanic acid. But its medicinal properties appear to reside in the astringent matters, consisting of tannic and gallic acids, with three resins, which have been examined and described under the names of Phæoretine, erythoretine, and aporetine, by MM. Schlossberger and Dœpping.

Starch, sugar, and mucilage are also found in various proportions in samples of rhubarb. The starch grains are very small, varying in size from the $\frac{1}{250}$ to the $\frac{1}{750}$ of an inch. Their shape is more or less oval or ovoid, and many are perceptibly marked with concentric rings.

Large quantities of oxalate of lime are found in the tissues of rhubarb, but chiefly in the Russian: it occurs in stellate groups of crystals, and it is owing to the presence of these crystals that rhubarb is gritty when chewed.

The origin and uses of these crystals or raphides are uncertain here, they appear to be due to the formation of vegetable acids in the sap of the plant by its vital action, and the gradual combination of these acids with the lime salts taken up from the earth by the roots, and the formation of stable compounds, or storehouses of strength, from which the same vital force can, as occasion requires, obtain supplies for the building of the fabric or skeleton of new parts.

Mr. Evans concluded by describing the method of grinding rhubarb, and the various preparations into which this invaluable medicine enters.

The Secretary laid before the meeting a copy of the proceedings of the Liverpool Architectural and Archæological Society, presented by that society to the Chemists' Association.

ORIGINAL AND EXTRACTED ARTICLES.

OBSERVATIONS ON THE VOLATILITY AND SOLUBILITY OF CANTHARIDIN IN VIEW OF THE MOST ELIGIBLE PHARMACEUTICAL TREATMENT OF SPANISH FLIES.

BY WILLIAM PROCTER, JUN.

Cantharides have been used in Pharmacy since the days of Hippocrates. It was not till 1810, however, that the principle giving them activity was isolated by Robiquet (*Annal. de Chimie*, lxxvi. 302,) and subsequently named *Cantharidin* by Dr. Thomas Thomson. Since then various experimenters have been engaged in the chemical investigation of these flies, and in the more recent treatises they are stated to consist of *cantharidin, yellow fixed oil, green fixed oil, a yellow viscous substance, a black matter, ozmazome, uric acid, acetic acid, phosphoric acid,* and the *phosphate of lime and magnesia*. It is proverbial among apothecaries and physicians, that the pharmaceutical preparations designed to produce vesication, vary very much in their power as prepared by different individuals, and from different samples of cantharides by the same recipes. Is this variableness of power due to the inequality of strength of the commercial drug? or, are we to attribute it to the treatment employed by the Apothecary? The real importance of these queries demands an answer. To proceed properly, the investigator should examine cantharidin in a pure state, ascertain how far the statements of writers are correct, then by a series of analyses, quantitative as regards that principle, determine whether its proportion varies, and to what extent, in different specimens of cantharides of fair quality; and finally test the preparations derived from the same samples and see how far they correspond with the inferences drawn from the ascertained properties and proportions of the active principle. I have at present undertaken to resolve but a part of these queries —yet by far the most important ones—as will be seen.

Cantharidin is a white, neutral substance, of which the formula according to Regnault is $C_{32}\,H\,O_8$. Gmelin considers it of the nature of a solid volatile oil. As usually seen it has the form of minute flattened four-sided prisms much broken up, so as to appear like scales. When deposited from an ethereal solution of cantharides by slow evaporation, or from its solution in hot acetic acid by cooling, it assumes the form of flattened oblique four-sided prisms with dihedral summits, derived from the rectangular prism by the bevelment of its edges. The crystals by slow sublimation are four-sided rectangular prisms of great brilliance and sometimes iridescent.

Solubility. Pure cantharadin is insoluble in water hot or cold. It is slightly soluble in cold alcohol, readily so when hot. Ether dissolves it to a greater extent, yet much more easily hot than cold. Chloroform is its best solvent, cold or hot, as shown in a former essay (*Am. Jour. Pharm.* vol. xxiii. 124,) and will remove it from the aqueous infusion of the flies. Acetic ether dissolves cantharidin, especially when hot, but does not retain much on cooling. When one part of cantharides is mixed with twenty parts of olive oil and heated to 250° Fahr. it is completely dissolved. As the solution cools, the cantharidin rapidly separates in shining needles in such quantity as at first to give the oil a pulpy consistence. The clear cold oil retains sufficient to act as an efficient rubefacient but not as an an epispastic. One part of cantharidin requires seventy parts of oil of turpentine to dissolve it at the boiling temperature, the greater part separating, as the solution cools, in long asbestos-like needles. A piece of paper saturated with the cold solution and applied to the skin under adhesive plaster did not vesicate. Acetone (from the distillation of acetate of lime) dissolves cantharidin with great readiness, and ranks next to chloroform in this regard. The solution deposits the substance in crystals by evaporation. The commercial methylic alcohol or wood naphtha also dissolves cantharidin, but to a much less extent than acetone. When acetic acid sp. gr. 1.41 (U. S. P.) is added to cantharidin, it but slightly acts on it in the cold; heat much increases its solvent power, which is lost on cooling and the substance deposited by standing, though not

immediately. One part of cantharidin was mixed with forty parts of *crystallizable* acetic acid and agitated together during five hours, but a small percentage was dissolved; but on applying heat the crystals were dissolved quickly. On standing, nearly all of the cantharidin was slowly deposited in regular crystals. To ascertain whether, as has been asserted,* a combination was effected, and an *acetate* of cantharidin produced, an acetic solution of cantharidin was evaporated to dryness and the crystals mixed with strong sulphuric acid and heated till dissolved, while the nose was held near, without the slightest evidence of acetic odour; one-twentieth of a grain of acetate of potassa was then added, which instantly evolved the well marked smell of acetic acid. Formic acid dissolves but a trace of cantharidin, cold or hot; and muriatic acid, sp. gr. 1.18 hardly can be said to act on it in the cold, but when boiling a minute portion is taken up. The same is true of phosphoric acid dissolved in five parts water. Sulphuric acid, sp. gr. 1.840, when heated readily dissolves pure cantharidin without being discoloured, and deposits it in crystals unchanged by cooling. Hot nitric acid, sp. gr. 1.38, dissolves cantharidin readily, and deposits the greater part of it on cooling in brilliant crystals, unchanged. A concentrated solution of ammonia slowly dissolves cantharidin to a small extent, and yields it up on evaporation in crystals. Solutions of potassa and of soda also dissolve this principle.

Its Volatility.—About ten grains of pure and perfectly dry cantharidin was spread on the pan of an Oertling's balance (sensitive to 1-150th of a grain) and the equilibrium carefully adjusted with platina weights. After exposure for a week to the action of the air, a vessel of lime being present to keep the air dry, no change in the adjustment had occurred. To further test the volatility of cantharidin, a portion of it was put at the bottom of a dry test tube, through a paper funnel so as not to soil the sides, which was then fixed so as to dip half an inch in a mercurial bath having a thermometer suspended in it. It lost nothing appreciable after being kept at 212° F. for half an hour, no sublimate being visible with a lens. At 220° F. no visible effect was produced. Kept at 250° F. for twenty minutes, a very slow sublimation commenced. At 300° F. the vaporization was but slightly increased. The heat was then raised to 360° F., when the sublimation became more decided, yet still slow. Between 402° F. and 410° F. it fused, and rapidly sublimed at a few degrees higher. Cantharidin at this temperature volatilizes with great ease and condenses in beautiful well defined crystals like salicylic acid.

The specific gravity of cantharidin is considerable, as it sinks in nitric acid, sp. gr. 1.784; it is exceedingly acrid; its powder applied to the skin with a little oil, produces speedy vesication, and taken internally it is an irritant poison of the most virulent kind.

Such are some of the more prominent characters of this remarkable substance, which exhibits a permanence and want of affinity extraordinary in an animal principle. Let us now see how far experiments with cantharidin, as it exists in the flies in substance, correspond with its behaviour in an isolated state.

1st. Is cantharidin, as it exists in Spanish flies, volatile at common temperatures, or at the temperature usually employed in making the cerate; and if so to what extent?

a. Six hundred grains of powdered cantharides were put into a quart flask, a pint of water poured on, and macerated two hours. The flask was then adapted to a glass tubulated receiver by means of a long glass tube, the joints made tight, and the tube refrigerated throughout its length by a current of cool water, the receiver itself being surrounded by water. A sand-bath heat was then applied and the materials in the flask kept boiling during several hours, until half a pint of liquid had distilled. The product in the receiver was opalescent, with white particles floating through it, and had a strong odour of Spanish flies. It was decanted into a bottle, and agitated repeatedly with half an ounce of chloroform, which dissolved the particles and removed the opalescence. The chloroform, when separated with a funnel, and evaporated spontaneously, yielded a colourless semi-crystalline residue, having a waxy consistence and a strong odour different from that of the flies. It fused at 120° Fahr., was volatile *per se*, but was partially decomposed and condensed in drops which subsequently solidified. This substance is soluble in alcohol, ether,

* *New York Journ. of Pharm.*, vol. i., p. 72.

and chloroform, is decomposed and dissolved by sulphuric acid, produces *no signs of vesication after forty-eight hours' contact with the skin* under adhesive plaster, and is most probably the same volatile principle that has been noticed by Orfila.

The long glass tube was then examined for a sublimate, by rinsing it thoroughly with chloroform, which, on evaporation, afforded more of the same substance obtained from the distilled water, and like it did not produce vesication.

This experiment shows conclusively that cantharidin *does not volatilize to an appreciable extent with water evaporating from cantharides.*

b. More water was added to the residue in the flask, again boiled for fifteen minutes and thrown on a displacing filter, and water added to the solid residue, after the decoction had ceased to pass, until the absorbed liquid was displaced. The decoction was much less odorous than the distilled water, and had a deep reddish-brown colour. Half of this was agitated repeatedly with chloroform. The latter decanted and evaporated yielded a crop of crystals intermixed with some colouring matter. A part of these heated in a tube over a lamp, gave immediately the brilliant crystalline sublimate of cantharidin well marked; another portion applied to the skin produced vesication in a few hours.

The other half of the decoction was evaporated to a soft extract by direct heat. This produced speedy and deep vesication, more effectual than that of pure cantharidin, as in the extract that principle was in a soluble state by virtue of the yellow matter of the flies.

c. The residual flies were then dried carefully and exhausted with ether, which assumed a deep green colour. A green semifluid fatty oil was obtained by evaporation, from which a fluid yellow oil separated by standing, which produced a tardy vesication, not comparable with the aqueous extract.

d. One hundred grains of flies in powder were introduced into a test tube so as not to soil the sides. This was then kept at the temperature of 212° F. during six hours, by causing it to dip into a vessel of boiling water through a tin plate. The hygrometric water was removed as it condensed above. At the end of the experiment a minute deposit of microscopic crystals less than one-thirtieth of a grain, was observed above the flies on the sides of the tube.

e. Two hundred grains of flies were introduced into a two ounce retort, which they half filled, adapted to a two ounce receiver, and this again connected with a third vessel. The retort heated by a mercurial bath, was kept at 225° F. for two hours, without any product except a little odorous hygrometric water. The heat was then raised to 412° F., when a colourless oily matter flowed slowly into the receiver, mixed with water, whilst a crystalline matter mixed with oil collected in the neck. This crystalline matter mixed with the oil produced vesication when applied to the skin. The heat was now rapidly increased so as to produce brown vapours, from which was condensed a dark coloured empyreumatic oil, abundant crystals of an ammoniacal salt collected in the tubes and on the sides of the receiver, whilst the aqueous liquor in the receiver was strongly ammoniacal. Neither the dark oil nor the crystals produced vesication, the high temperature having probably decomposed the cantharidin.

From these experiments it must be admitted that cantharidin is less volatile than has been asserted. The effect produced on the eye of the pupil of Robiquet who was watching the crystallization of cantharidin during the evaporation of an ethereal solution, may be accounted for by the mechanical action of the dense ethereal vapour escaping near his eye, as he watched the process with a lens, carrying off some particles of cantharidin; and the readiness with which this principle may be brought mechanically in contact with the skin of the face, during a series of experiments, by want of care, will easily account for the occasional testimony of writers in favour of its volatility at low temperatures based on that kind of evidence. During the whole of the experiments detailed in this paper, the author has not experienced any inconvenience to his eyes or face except in two instances, once when decomposing cantharides by destructive distillation, during which some of the vapours escaped near his person, and again where a small capsule containing aqueous extract of cantharides was accidentally exposed to high temperature over a lamp so as to partially decompose it; he suffered slight pain for a few hours in the conjunctiva of both eyes.

It must also be admitted that the heat ordinarily employed in making the

blistering cerate of the United States Pharmacopœia, does not injure the preparation by volatilising the cantharidin, and that the recommendation to digest the flies in the melted vehicle on a water-bath is not only not injurious, but decidedly advantageous, as it increases, many fold, the solvent power of the fatty matter.

2nd Having ascertained the solvent powers of olive oil, oil of turpentine, and acetic acid, on pure cantharidin, the following experiments were made with those menstrua, and with water, on the flies in substance :—

a. 100 grains of powdered cantharides were mixed with 200 grains of olive oil in a large test tube, which was corked, and the mixture heated in a boiling water bath during four hours, with occasional agitation. The contents of the tube were then poured into a small glass displacement apparatus, surrounded with water kept hot by a lamp, and the saturated oil gradually displaced, without cooling, by the addition of fresh portions of oil. The oily liquid thus obtained had a deep green colour, smelled strongly of the flies, and when applied to the skin produced full vesication in about twelve hours contact. After standing twenty-four hours shining needles of cantharidin gradually separated, but not in quantity.

b. 100 grains of powdered flies were mixed with 200 grains of pure oil of turpentine in a closed tube, heated in a boiling water-bath four hours, and displaced while hot as in the preceding experiment. The terebinthinate solution had a dull yellow colour, and was perfectly transparent as it passed, but in a short time numerous minute stellated crystals commenced forming, which increased in quantity by standing. The saturated cold solution, separated from the crystals after standing twenty-four hours, did not blister when applied to the skin.

c. 100 grains of powdered flies were digested in a close vessel, at the temperature of boiling water, in 300 grains of acetic acid, sp. gr. 1.041, for six hours, and then subjected to displacement in the hot filter above noticed. A dark reddish-brown transparent liquid passed, which had very little odour of flies, even when a portion was exposed until the acetic acid had nearly all evaporated. A portion of this liquid applied to the skin produced complete vesication in about ten hours. After standing a few hours, numerous minute granular crystals were deposited, which gradually increased in amount and size.

These three experiments prove that hot fatty matter is a good solvent for cantharidin as it exists in the flies, and that it retains more on cooling than either turpentine or acetic acid. That hot oil of turpentine is a good solvent for extracting cantharidin, although it does not retain much on cooling, and that officinal acetic acid at the temperature of 212° F. will remove cantharidin readily from Spanish flies, but retains but a part on cooling.

d. 500 grains of recently powdered flies, contained in a flask, were boiled in a pint of water, for an hour, and the clear decoction decanted, the residue again treated with half a pint of water, so as to remove all matter soluble in that liquid. The decoctions were mixed, filtered, and evaporated carefully to dryness. The extract was exhausted by repeated treatment with boiling alcohol, which left a dark coloured pulpy matter, very soluble in water, from which it is precipitated by subacetate of lead. The alcoholic solution was now evaporated to a syrup, and on cooling yielded a yellow extract like mass interspersed with numerous minute four-sided prisms. By washing a portion with water, the yellow matter was removed, leaving the crystals white and pure. The aqueous washings yielded by evaporation a residue of crystals, and does not vesicate. When the alcoholic extract was treated with chloroform the crystals were dissolved, and the yellow matter left. On evaporating the chloroform solution the crystals were re-obtained with all the characters of cantharidin. The matter left by chloroform was now treated with water, in which it dissolved, except a trace of dark substance, and was again evaporated carefully. It afforded a yellow honey-like residue, thickly interspersed with crystals and strongly acid to litmus, without vesicating power.

A portion of the yellow matter separated from the alcoholic extract by water was boiled with some cantharidin, filtered and evaporated. The residue treated with chloroform afforded no cantharidin ; hence it would appear that although the yellow matter enables the cantharidin to dissolve in water and cold alcohol, when once separated its solvent power ceases.

Having now studied the effects of the ordinary solvents on cantharidin in a free state, and in the condition in which it exists in the insect, we are prepared to

consider with some clearness, the pharmaceutical preparations of the Spanish fly, and their action as vesicants.

a. If one-thirtieth of a grain of pure cantharidin, in fine powder, be placed on the skin of the arm and covered with a piece of warmed adhesive plaster, active vesication occurs in eight hours, with pain. If the same quantity of cantharidin be put on the other arm, a small piece of paper be laid over it, and then a piece of adhesive plaster with a circular hole in it be applied, so as to hold on the paper, no vesication occurs in sixteen hours, the powder remaining dry. If then a large piece of plaster be put over the whole, at the end of eight hours more no blistering action will have taken place. If now a trace of olive oil be applied to the back of the paper covering the cantharidin, and the plaster replaced, speedy vesication will occur. These experiments prove that cantharidin must be in solution to have its vesicating action, and that oily matter is a proper medium.

b. When powdered flies are stirred into the ordinary vehicle of resin, wax, and lard, so as to chill it almost immediately as was formerly directed, but little of the cantharidin is dissolved by the fatty matter, and when applied to the skin the process of vesication is retarded. If, however, the cerate be kept fluid for a length of time, say for half an hour, by a water-bath or other regular heat, no loss of cantharidin occurs by the heat, the active principle is in great measure dissolved by the fat, and every part is impregnated and active. In the foregoing experiments it has been shown that twenty parts of olive oil will dissolve one of cantharidin when hot. If we admit with Thierry that cantharides contain but four thousandths of their weight of cantharidin, the quantity contained in a pound of cerate is about *eight* grains, whilst the lard in the same weight of cerate is 1600 grains, or two hundred times the weight of that principle, not to speak of the influence of the wax and resin, which, in union with the melted lard, act as solvents. Hence the whole of the cantharidin may be dissolved by the vehicle. Another advantage of employing a continued heat in digestion is the removal of the hygrometric water from the flies, which is the source of the mouldiness to which the cerate is prone in certain conditions.

In a former essay (*Amer. Journ. Pharm.*, vol. xiii, p. 302), I have advocated digestion in making this cerate (a recommendation also made by Mr. Donovan, of Dublin, about the same time), and also the use of a portion of the oil of turpentine to facilitate the solution of the cantharidin, but the foregoing experiments prove that fatty matter is quite as good, if not a better solvent alone, than with turpentine.

c. It has been asserted long ago by Beaupoil, Robiquet, and others, that water will perfectly extract the active matter from Spanish flies, which these experiments corroborate. Hence it is easy to understand how the condensed perspiration may facilitate the action of a blister, especially when, as was formerly much the case, its surface is coated with the dust of the flies and the skin moistened.

It is also clear why the Unguentum Cantharidis of the U.S. Pharmacopœia is active although made with a decoction of flies, yet, in this preparation, care should be observed not to evaporate all the water, as on the existence of the aqueous extract in a soft state depends much of the efficiency of the preparation as an irritant dressing.

d. In the Linimentum Cantharidis, U. S. Pharm., in which an ounce of flies is digested in eight fluid ounces of oil of turpentine, the cantharidin is to the menstruum as 1 to 1500, a proportion probably quite sufficient to retain it in solution. The importance of the officinal direction to digest is evident. It is quite doubtful whether this liniment, as made by the process of Dr. Jos. Hartshorne, one part of flies to three parts of oil, will retain all the cantharidin after standing awhile.

e. The Acetum Cantharidis, (Lond. Ph.) made by macerating an ounce of flies in ten fluid ounces of acetic acid, 1.48, has been criticised by Mr. Redwood, (*Pharm. Journal*, Oct. 1841,) who arrived at the conclusion that it owed its vesicating power almost solely to the acid, he not being able to discover cantharidin in it. The inefficiency of *cold* acetic acid as a solvent for *pure* cantharidin has been proven by the above experiments, and its efficiency when hot equally shown. There can be little doubt that the London preparation would be much improved by *digesting* the flies in the acid for an hour in a close glass vessel at the temperature of boiling water.

f. The *cantharidal collodion* of M. Ilisch has been considerably used as a vesicant in this country. Ether being a good solvent for cantharidin readily keeps that

principle in solution. When applied to the skin, the escape of the ether leaves a coating of ethereal extract of cantharides, admixed with collodion. This preparation sometimes fails from a deficiency of cantharidin, at other times from want of a sufficient body in the collodion excipient, and it has been found more advantageous to treat the cantharides with ether till exhausted, distil off the ether, and add the oily residue to collodion of the proper consistence. The addition of a little olive oil, and of Venice turpentine, as recommended by Mr. Rand, will give more activity to the preparation, especially if a piece of oiled silk or adhesive plaster be applied over the part.

9. Besides these, many other epispastic preparations are made in France and other countries. The acetic alcoholic extract of cantharides of Ferrari is made by digesting four parts of cantharides in sixteen parts of alcohol 36° B. mixed with one part of acetic acid 10° B. In the opinion of the author, the acetic acid tends to prevent the crystallization of the cantharidin, a statement rendered doubtful by the above experiments, as that principle separates in crystals from an acetic solution of cantharides. The alcohol dissolves the green oil which gives to the extract a butyraceous consistence. This is undoubtedly an efficient preparation, and is used by spreading it on paper with a brush, and applying to the skin. Nearly all the French preparations direct digestion of from two to six hours, showing evidently that the experience of Pharmaceutists is opposed to the opinion that cantharides is "a very volatile substance, even at common temperatures."

The vesicating tafeta of the Codex, is that proposed by Messrs. Henry and Guibourt, and is made by fusing together one part of the ethereal extract of cantharides and two of wax, and spreading it on waxed paper or linen in the manner of adhesive plaster. This preparation is said to lose its efficiency by exposure to the air. How can this occur in view of the results which have been detailed above? admitting the fact, is it not probable that the change lies in the strong tendency of the cantharidin to separate in crystals? a change easily observable in the ethereal extract. This is the chief objection to some otherwise excellent preparations of cantharides for vesication, and it is far more probably the true explanation than that volatility should be the cause.

The recently prepared and soft aqueous extract of cantharides has been shown to be a powerful epispastic. Will this extract of the consistence of honey, associated with sufficient acetic acid, alcohol, or acetone, to preserve it, keep without the gradual separation of the cantharidin? If so, it will undoubtedly prove one of the very best blistering agents, as by simply applying a covering of it over the surface of waxed paper, or adhesive plaster, with a camel's-hair-brush, a perfect blistering plaster can be made quickly and neatly, and all tendency to change of aggregation by the action of the air on the menstruum avoided. This is a question now under trial, and should it result favourably, a formula will be published. The extraordinary tendency of cantharidin to crystallize, even under the most adverse circumstances, taken in connection with its insolubility, *per se*, has hardly received sufficient attention from Pharmaceutists as a cause of the deterioration of cantharidal preparations, and the discovery of a menstruum, that will retain that principle in solution for an indefinite period, is a problem yet to be solved, and worthy the attention of pharmaceutical investigators.—*American Journal of Pharmacy.*

Philadelphia, September, 1852.

ON THE OIL OF THE ARGEMONE MEXICANA AS A REMEDY FOR ASIATIC CHOLERA.

BY W. HAMILTON, M.D.

Asiatic cholera rarely makes its attacks without previous warning, and, if individuals would only pay reasonable attention to the premonitory symptoms, much, if not the whole, of the fearful mortality which has already, upon two occasions, desolated our land, might be prevented. The premonitory symptoms usually point to a disturbance of some kind or other in the organs of digestion, which, from whatever cause it may arise, calls for active interference to subdue.

The most obvious mode of answering this indication, is to keep the first passages free, and thus prevent the accumulation of that feculent matter whose irritation, produces the premonitory symptoms, and ultimately leads to that spasmodic action which is among the most painful accompaniments of Asiatic, or, as it has been more aptly designated, spasmodic cholera.

To relieve the abdominal irritation by carrying off the feculent matter which occasions it, purgatives of the milder and least irritating or drastic character should be carefully administered in combination with some anti-spasmodic, to modify their action, and counteract the strong and painful tendency to spasm or cramp, as it is commonly termed.

Now both these objects may be attained by the most moderate doses of the oil obtained from the seeds of the Argemone Mexicana, a plant which flourishes spontaneously in the greatest abundance in waste places, and among rubbish throughout I believe the whole of the West Indian Archipelago, where it may be found blossoming and loaded with seed in every stage to maturity throughout the year.

It is now above eight years since I first endeavoured to direct medical attention to this valuable but neglected plant, through the pages of the Pharmaceutical Journal, in the fourth and fifth volumes of which communications on this subject will be found at pages 167 and 23.

In the passages referred to, we have the testimony of two experienced Practitioners of Jamaica to the valuable aperient, anodyne, and hypnotic effects of these seeds; properties which are also possessed by the oil which they yield, in a more convenient and less bulky form, the dose being restricted to a few drops. The oil will be best obtained from the recent seeds, on the spot where they grow spontaneously; and, as the Pharmaceutical Society numbers among its Members residents in the regions in which the argemone flourishes and yields its harvests throughout the year, individuals, it is to be hoped, may be found philanthropic enough to prepare some of the oil with care, so as to guard against the possibility of adulteration, and transmit it to the Council of the Society for a trial of its effects, before we are again subjected to the decimating scourge of that strange and fearful malady which has slain its thousands on the continent of Europe during the past season, and will, not improbably, visit our own shores before another year completes its circle.

It is idle to object that cholera has destroyed its victims in the very island in which both Affleck practised and Barham wrote, unchecked and unmitigated by the remedy proposed, although found at the thresholds of the sufferers. Prejudice is often stronger than reason, and a prepossession in favour of old and what are reputed to be orthodox remedies, too often indisposes us to view with favour those which are unstamped by the signet of time, however strong and however conclusive the testimony of their value.

But the present is an age of inquiry and of research; we are progressively rising above the mists of past ignorance, and learning to withhold our condemnation till assured of its being merited.

Cholera is at hand; and, however potent sanitary measures may be in mitigating its ravages, the science of medicine cannot be dispensed with, and when the destroyer comes—as we have too just ground for fearing he will come—the addition of this little article to the artillery of the Pharmaceutist may avert death from thousands, and add a fresher laurel to the triumphs of art.

14, *Octagon, Plymouth, 10th November*, 1852.

ON THE MANUFACTURE OF VINEGAR.

Extracted from a Report of a Chemical Examination of the Vinegars manufactured by Messrs. Hill, Evans, and Co., of Worcester.

BY PROFESSORS GRAHAM, HOFMANN, AND PLAYFAIR.

The processes which are usually followed in the manufacture of the acid of vinegar, that is, acetic acid, although greatly varied in their details, appear to involve only two important chemical principles. When billets of wood enclosed in an iron cylinder

are distilled by the heat of a fire, like coal in gas-making, there passes over, in addition to tar, creosote, and such products, much watery fluid, sour from containing acetic acid, but highly contaminated with the empyreumatic products referred to. This vinegar from wood, called pyroligneous acid, is largely consumed by calico-printers, dyers, and the manufacturers of white lead, who are enabled to make use of it from its comparative cheapness. It is less adapted for the table, from the extreme difficulty of purifying this acid in a perfect manner, and divesting it completely of every trace of its unpleasant accompaniments; while even in its fully purified condition it affords a vinegar destitute of the aroma and flavour which the liquid from other vegetable sources possesses. The absolutely pure wood vinegar bears, to such other vinegars, the relation of diluted alcohol to the wine of the grape and other fermented liquids, each of which possesses a flavour and bouquet of its own, in addition to its spirit.

The alcohol in wine, beer, and all other fermented liquors, is readily convertible into acetic acid, by a chemical change which is uniformly of the same nature. The acetification of alcohol is, indeed, a process of the greatest simplicity, consisting as it does of nothing more than the absorption of oxygen from the atmosphere. By the addition of this element to the alcohol, that liquid is transformed into acetic acid and water.

This oxidation of the alcohol is carried on in the most direct and scientific manner, in what is known as the German process, but which appears to have been imagined by Mr. Ham, of Bristol, quite independently, and patented in England about thirty years ago. It is this process which we have had an opportunity of observing in active operation in the vinegar-works of Messrs. Hill, Evans, and Co., of Worcester, who were among the first to adopt and carry out Mr. Ham's ingenious ideas. Malt vinegar being the kind here manufactured, the antecedent operations of mashing the grain in water at a temperature of about 154°, and fermenting the sweet infusion thus obtained in large vats, by the aid of yeast, so as to convert the saccharine matter into alcohol, are necessarily the same as those of ordinary brewing, as seen practised in distilleries. The spirituous liquid thus furnished is suitable, without further preparation, for the oxidizing, which appears as a species of aeration, the spirituous liquid being showered upon the surface of a mass of faggots of birch twigs, occupying the upper part of a large vat, and, after trickling to the bottom, being returned again and again to the top by the constant action of a pump. The oxygen of the air is continually absorbed by the circulating fluid; and the air, which is admitted by a small aperture in the vat below the level of the faggots, passes away by the openings in the cover of the vat, more or less exhausted of its active element. The process comes to a termination when all the alcohol is oxidized; and this is learned from the progressive rise in the proportion of acid in the liquid being found to cease. The product, when drawn off, is already finished vinegar, but is always kept in store for some time to clarify, or, as it is said, to mature it, before being sent into the market.

This mode of oxidizing the alcohol, which is rapid and effective, appears to have the incidental advantage of changing and rendering insoluble certain glutinous and albuminous matters in the fermented wort, which are apt, if not got rid of at this stage of the process, to occasion after-muddiness in the vinegar, and to prevent its keeping. It was generally considered necessary in the vinegar trade, at a former period, to add a small portion of sulphuric acid to vinegar in order to counteract this tendency of the liquid to decomposition, and to preserve it from turbidity. This addition of sulphuric acid was permitted to the extent of one gallon of sulphuric acid to one thousand gallons of vinegar, by an excise regulation, and had, therefore, a legal sanction. But sulphuric acid is now known to be unnecessary in properly-prepared vinegars, although still added by some manufacturers for the purpose of increasing the strength of their vinegar, or, in some instances, merely from habit and the indisposition to disturb the routine of an old-established practice. The presence of sulphuric acid in vinegar should be looked upon as the mark of inferior quality, for it is only where the mode of manufacture is defective that the addition appears to be at all necessary.

ON THE CHEMICAL COMPOSITION OF QUINIDINE.

BY H. G. LEERS.

Quinidine, discovered several years ago by Winckler,* in a bark resembling Huamalies cinchona, and also in Maracaibo cinchona, has never yet been subjected to an accurate analysis, although this base appears to be daily acquiring a greater importance in relation to quinine.

In consequence of the government of Bolivia having monopolized the exportation, and by this means raised the price of *Calisaya cinchona* (the principal material for the manufacture of quinine), a cheaper bark is now imported, under the name of Bogota cinchona,† which contains chiefly quinidine, and but a small proportion of quinine.‡

From this Bogota cinchona, large quantities of quinidine are now prepared for admixture with quinine. The proportion of alkaloids in this bark was in two experiments, 2.61 and 2.66 per cent. It appeared, therefore, of great interest to obtain a more exact knowledge of the chemical relations of this substance, which, in the crude state in which the author received it from Mr. Zimmer, was beautifully white and distinctly crystallized, but still not perfectly pure. It contained an uncrystallizable, yellowish-green resinous substance, together with quinine (according to the test with chlorine water and ammonia), and very probably also a third substance, containing a larger proportion of carbon.

The following operations were performed in the laboratory of Prof. Will :—

In order to obtain the base in a perfectly pure state, the rough quinidine was dissolved in alcohol of 90 per cent., and the solution allowed to evaporate spontaneously in the air, when a greenish-yellowish resinous substance soon appeared on the walls of the vessel. The most beautifully formed crystals were then selected, washed with alcohol, and re-dissolved in spirit of wine, when the same greenish-yellow substance was deposited. The re-crystallization having been performed five or six times, until the yellow substance was no longer perceived, and the proportion of carbon in the base not yet proving uniform, the crystals obtained after five or six times repeated re-crystallization were finely powdered and shaken with ether, until all reaction of quinine disappeared, and the proportion of carbon remained constant.

If quinidine be dissolved in spirit of wine of 90 per cent., and the solution left to spontaneous evaporation, it forms colourless, hard prisms, shining like glass, with edge-angles of 86° and 94° ; the planes of the prisms are strongly striped, these stripes being also observable on the planes of truncation of the more obtuse edges of the prism ; and in the direction of the latter planes the crystals admit of perfect cleavage. The crystals are terminated by shining planes, which converge at 114° 30', and are applied on the more acute edges of the prism.

The rather hard crystals are easily rubbed to a snow-white powder, which becomes electrical by friction. If the crystals be heated in a platinum crucible over the flame of spirit of wine, they at first retain their brilliancy and form, and fuse without decomposition, and without yielding water, at 175° C., and form a clear, wine-yellow liquid, which, when cold, solidifies into a greyish-white crystalline mass. If the heat be increased above 175°, the wine-yellow fluid ignites, burns with a red, vividly flaring, strongly sooty flame, evolving at the same time an odour of kinoyl and of oil of bitter almonds, and leaves behind a voluminous easily combustible charcoal. The taste of quinidine is not so intensely bitter as that of quinine.

In order to determine its solubility, quinidine was rubbed down with water of 17° C., and shaken. 36.1 grammes of the solution left after evaporation 0.014 grms.

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* Buchner's *Repert. d. Pharm.* [2] xlviii. [See also a paper in the *Pharmaceutical Journal*, vol. vii., p. 527.]

† The bark here called *Bogota cinchona* is usually known in England as a Carthagena bark; and to distinguish it from the common hard Carthagena bark, it is sometimes called *fibrous Carthagena bark*. Coquetta bark is one sort of this bark.—Ed. *Pharm. Journ.*]

‡ In order to ascertain whether Bogota cinchona, like other cinchona barks, contained kinic acid, some finely powdered Bogota bark was boiled with hydrate of lime, and the obtained kinate of lime submitted, along with peroxide of manganese and sulphuric acid, to distillation, by which was obtained a liquid containing kinone.

of quinidine dried at 100° ; one part of quinidine, therefore, was soluble in 2580 parts of water at 17°.

42.7 grms. of pure quinidine dissolved in water at 100°, and treated as before, left 0.023 grms. of quinidine = 1 part to 1858 parts of water at 100° C.

The solubility in ether was determined by shaking finely powdered pure quinidine with ether of 0.728 spec. grav. at 17° ; 19.4 grms. of this solution, by evaporation yielded 0.137 grms. of quinidine dried at 100°, or 100 parts of the solution contain 0.70 of quinidine. According to Winckler, 100 parts of ether dissolve 0.6923 parts of quinidine. One part of quinidine dissolves in 12 parts of alcohol of 0.835 spec. grav. at 17°.

Analysis of Quinidine.—1. *Crude quinidine* finely powdered and dried at 110° until it lost nothing, yielded :—

	I.	II.
Carbon	77.34	77.62
Hydrogen	7.86	7.90

2. *Pure Quinidine*, obtained by being four or five times re-crystallized from alcohol, finely triturated and shaken five or six times with ether, till chlorine water and ammonia produced no reaction of quinine, was washed with water and dried at 110°, till the weight remained constant. The results were :—

	I.	II.	III.	IV.	V.	VI.	VII.
Carbon	76.88	76.82	76.79	76.40	76.55	76.49	—
Hydrogen	7.70	7.76	7.77	7.73	7.70	7.81	—
Nitrogen	—	—	—	—	—	—	9.99

With reference to the analysis of the salts of quinidine, and the determination of the atomic weight of the base from the proportion of platinum in the platinum double salt, the following formula is calculated for quinidine :—

$C_{36}\ H_{22}\ N_2\ O_2$.

		Calculated.	Average of the Experiments.
36 equiv.	Carbon	216 ..... 76.59	76.66
22 "	Hydrogen	22 ..... 7.80	7.74
2 "	Nitrogen	28 ..... 9.93	9.99
2 "	Oxygen	16 ..... 5.68	—
1 "	Quinidine	282 ..... 100.00	

If quinidine be subjected with hydrate of potash and a small quantity of water to distillation, a yellow oleaginous substance is obtained, which reacts as an alkali, and possesses all the properties of quinoline. Repeatedly washed with distilled water, it yielded a beautifully yellow oily liquid, from which muriatic acid and chloride of platinum threw down an orange-yellow precipitate, which, after having been perfectly exhausted by cold water, was dissolved in hot water. When cold, the platinum salt precipitated from the solution in the form of small orange-red needles. Dried at 110°, 0.695 grms. of the platinum salt yielded, after being burnt, 0.204 grms. of platinum = 29.35 per cent. If the formula for quinoline, $C_{18}\ H_7\ N$, be correct, that of the platinum salt of quinoline would be $C_{18}\ H_7\ N,\ H\ Cl,\ Pt\ Cl_2$, and the salt would contain 29.47 per cent. of platinum.

Finely powdered quinidine dissolves in chlorine water without any particular phenomena ; quinine and cinchonine have the same relation to chlorine water. But if ammonia be added to these solutions, the cinchonine falls down from the cinchonine solution of a white colour, the quinine solution becomes green like grass, and the quinidine solution remains unaltered. The reaction upon quinine becomes still more sensible by ether, if the substance to be tested for quinine be first finely powdered, then shaken with ether, and to the ether, chlorine water and ammonia be added, the least trace of quinine may be detected by the liquid becoming green. By this test, the absence or presence of quinine could very easily be detected in the preparation of the quinidine salts.

Salts of Quinidine.—Most of these salts are much more readily soluble in water than the salts of quinine. In spirit of wine, they dissolve very easily, in ether scarcely at all. There are acid and neutral salts of quinidine, of which there are but few which are not distinctly crystallizable ; some furnish beautiful large crystals with a vitreous brilliancy. The aqueous solutions of the quinidine salts yield with potash, soda, and ammonia, the mono- and the bicarbonates of the alkalies, white pulverent precipitates, which crystallize after long standing, and are insoluble in an excess of the precipitant.

Phosphate of soda, bichloride of mercury, and nitrate of silver, yield white precipitates. Chloride of gold gives a light yellow, chloride of platinum an orange yellow, and chloride of palladium a brown precipitate. Sulphocyanide of ammonium yields a white and tannic acid, a dirty yellow colour, with the salts of quinidine.

Neutral Sulphate of Quinidine —This salt was prepared by dissolving quinidine in diluted sulphuric acid, till the latter was neutralized. The neutral solution having been evaporated in the water-bath, yielded by cooling long silky shining acicular crystals, arranged in star-like groups, of sulphate of quinidine, the watery solution of which was neutral. In order to establish the solubility of this salt, the crystals were rubbed down with water of 17°, and then some time shaken. The perfectly saturated solution was afterwards filtered, 43.1 grms. of the filtrate were evaporated to dryness, and the residue dried at 110°, the result was 0.325 grms. of sulphate of quinidine. It required, therefore, 130 parts of water at 17° to dissolve one part of the sulphate.

33.5 grms. of a solution saturated at 100°, yielded, after being evaporated and dried at 100°, 1.904 grms. of the salt = one part of the salt in 16 parts of water. Sulphate of quinidine dissolves very readily in alcohol, but is almost insoluble in ether. Analysis of 100 parts :—

	Found. I.	II.	III.	IV.	Average.	Calculated.
Carbon	64.70	64.79	—	—	64.75	65.25
Hydrogen	7.18	6.91	—	—	7.05	6.95
Sulphuric acid	—	—	11.99	12.02	12.01	12.08

Corresponding formula : $C_{36}\ H_{22}\ N_2\ O_2,\ SO_3\ HO$.

Acid Sulphate of Quinidine.—The salt was obtained by adding to the neutral sulphate as much acid as it already contained.

The clear, very acid, and strongly opalizing solution was evaporated in the water-bath, and then placed under the air-pump, over sulphuric acid. After the solution had arrived at the consistency of a syrup, and had assumed an intensely brown colour, a crystalline mass of rather thick asbestos-like needles of a slight yellow colour was formed. These crystals, after being removed from the mother-liquor, were washed with a mixture of alcohol and ether, and pressed between folds of filtering-paper, which did not deprive them of their yellowish colour. The proportion of sulphuric acid in the salt varied considerably several times, which arose very likely from the presence of some neutral sulphate, and for this reason no analysis is given.

Neutral Hydrochlorate of Quinidine.—Pure quinidine was finely powdered and mixed with water, then as much muriatic acid added by drops with the addition of heat, till the whole of the quinidine was dissolved, and the solution was neutral to test-paper. By the spontaneous evaporation of the solution the muriate of quinidine was obtained in the form of large rhombic prisms of a vitreous lustre. The mother-liquor yielded no crystals, even after having been evaporated to the consistency of a syrup and left standing for several weeks in the dry air. The solubility was determined by rubbing down the crystallized salt with water of 17°, and shaking, till the latter took up no more salt. Of the filtered liquid 7.067 grms. were evaporated, and the residue dried at 100° weighed 0.252 = 1 part of the salt, therefore, required 27 parts of water. Alcohol dissolved the salt very easily, ether scarcely at all. Analysis showed in 100 parts :—

	Found. I.	II.	III.	IV.	Calculated.
Carbon	64.57	64.11	—	—	64.19
Hydrogen	7.28	7.06	—	—	7.13
Chlorine	—	—	9.95	10.16	10.54

Corresponding formula :—

$C_{36}\ H_{22}\ N_2\ O_2\ 2\ H\ Cl,\ 2\ HO$.

Acid Hydrochlorate of Quinidine.—To the last salt as much muriatic acid as it already contained was added, and the solution, left to evaporate spontaneously, yielded beautiful, large, slightly yellowish crystals, which are monoklinometric and have the appearance of rhombic prisms.

Perfectly dried over sulphuric acid at 100° the acid muriate of quinidine lost 5.8 per cent. of water. It is easily soluble both in water and spirit of wine. In 100 parts were :—

	Found. I.	II.	III.	Calculated.
Carbon.....	58.30	—	—	57.93
Hydrogen.....	7.12	—	—	6.97
Chlorine	—	18.96	19.00	18.99

Corresponding formula :—

$C_{38}\,H_{22}\,N_2\,O_2,\,2\,H\,Cl+2\,HO.$

Platinum-Chloride of Quinidine.—The most beautiful crystals of the muriate of quinidine were dissolved in water, the solution diluted, acidulated with muriatic acid and chloride of platinum added as long as a precipitate was obtained. The orange-yellow precipitate was then placed on a filter and washed with acidulated water till chloride of platinum was no longer detected in the washings. The precipitate dried at 110°, was burnt, and gave the following results. In 100 parts were:—

	Found. I.	II.	III.	Average of experiments calculated.
Platinum.....	27.05	27.17	27.13	27.11 ... 27.04

These numbers correspond to the formula:—

$C_{38}\,H_{22}\,N_2\,O_2,\,2\,H\,Cl,\,2\,Pl\,Cl_2+4\,HO.$

Mercury-chloride of Quinidine.—Pure quinidine was dissolved by the aid of heat in alcohol of 85 per cent., acidulated with muriatic acid and an equal weight of bichloride of mercury dissolved in ether, added to the solution. When the mixture had become cold the mercury-chloride of quinidine was obtained in the form of small scaly pearly crystals, which dissolved with great difficulty in water. The crystals were placed on a filter, thoroughly washed and pressed between folds of filtering-paper; when dried over sulphuric acid they lost no water at 110°.

In 100 parts were:—

	Found. I.	II.	III.	IV.	V.	Calculated.
Carbon.....34.77	...	—	...	—	...	34.52
Hydrogen ... 4.01	...	—	...	—	...	3.83
Quicksilver... —	...	31.98	...	31.91	...	31.97
Chlorine ..... —	...	—	...	—	...	22.63

Corresponding formula:—

$C_{38}\,H_{22}\,N_2\,O_2,\,2\,H\,Cl,\,2\,Hg\,Cl.$

Nitrate of Quinidine.—If pure quinidine be dissolved by the aid of heat in moderately diluted nitric acid until the solution is neutral to test-paper, and the strongly opalizing mixture evaporated over sulphuric acid, the nitrate of quinidine crystallizes after some time in beautiful large warty crusts, resembling enamel. If the mother-liquor be allowed further to evaporate, a hemispherical white mass, resembling wax, forms on the surface, whilst the liquid becomes slightly green. This salt readily dissolves in water.

Chlorate of Quinidine.—By the mutual decomposition of neutral sulphate of quinidine and chlorate of potash, this salt was obtained in a perfectly pure state after having been re-crystallized from alcohol of 90 per cent. It forms long, white silky prisms grouped in tufts. By a gentle heat it fuses into a transparent mass, but explodes very violently at a higher temperature.

Hyposulphite of Quinidine.—It was obtained by the mutual decomposition of neutral sulphate of quinidine and hyposulphate of soda. When the solution cools, the hyposulphate of quinidine crystallizes in thin, long asbestos-like needles. In water this salt dissolves with some difficulty, but is very soluble in ether.

Fluate of Quinidine.—Pure quinidine in fine powder was suspended in water and placed in an apparatus for the development of fluoric acid; after some time, the quinidine contained in the water entirely dissolved, and a clear, intensely acid, slightly opalizing liquid was obtained. The solution was left to spontaneous evaporation, and yielded a mass of fluate of quinidine, consisting of white, silk-like crystalline needles, which dissolved with great readiness in water. Upon the addition of chloride of calcium a precipitate was formed, which was insoluble in acetic acid.

Acetate of Quinidine.—This compound is obtained by dissolving by the aid of heat finely powdered quinidine in diluted acetic acid. When cold, the acetate of quinidine appears in the form of thin, long silky needles, which do not easily dissolve in cold water. When dried, the salt easily loses part of its acid. On removing the first crystals and allowing the mother-liquor to evaporate spontaneously, a salt crystallizes from it, consisting of a mass of semi-globularly grouped, small pointed needles, having an appearance of porcelain. This salt is by far more soluble in water than that above mentioned.

Oxalate of Quinidine.—If an alcoholic solution of oxalic acid be added to an alcoholic solution of quinidine with the application of heat, till the liquid is neutral to test-paper, the oxalate of quinidine crystallizes from the solution after the latter has become cold, in the form of long, white, silky needles, which dissolve with great difficulty in water. From the spontaneously evaporated mother-liquor a salt in the shape of warty crusts with an opaque white appearance crystallizes, which dissolves with less difficulty in water.

Tartrate of Quinidine.—With tartaric acid quinidine forms two compounds, which appear to possess great resemblance to the oxalates. On saturating tartaric acid with quinidine, at a boiling heat, a salt separates, when the solution cools, in the shape of small pearly needles, which dissolve, but with great difficulty, in water. The solution of neutral tartrate of quinidine having been allowed to evaporate spontaneously, yielded beautiful vitreous needles, and by the further evaporation of the mother-liquor, small, semi-globular, white, opaque shining crusts of small needles appeared.

Citrate of Quinidine was obtained by saturating pure quinidine with pure citric acid at a boiling heat. From the cold neutral solution of the citrate of quinidine, small, but slightly glittering needles crystallized, which did not easily dissolve in water.

Formate of Quinidine, obtained by saturating the pure aqueous formic acid with quinidine. The salt forms long, beautiful, silky needles, readily dissolving in water.

Butyrate of Quinidine.—Aqueous butyric acid was saturated with an alcoholic solution of quinidine. The salt crystallized from the neutral solution in large warty crusts resembling porcelain. It was very soluble, and smelt strongly of butyric acid.

Valerianate of Quinidine.—Aqueous valerianic acid being saturated with an alcoholic solution of quinidine, and the neutral solution left to spontaneous evaporation, the salt soon appeared in the shape of warty crusts, in the centre of which was a lighter body of a radiating structure. The salt smelt strongly of valerianic acid. The solution of the valerianate of quinidine having been evaporated in the water-bath, the liquid assumed a brown colour, emitting a penetrating odour of valerianic acid, whilst at the same time oily drops were evolved.

Kinate of Quinidine.—Pure kinic acid, dissolved in water was saturated whilst heated, with quinidine. The spontaneously evaporated neutral solution yielded a white milky mass of small needles, soluble both in water and spirit of wine.

Hippurate of Quinidine.—Pure hippuric acid, dissolved in spirit of wine, was saturated with quinidine under the application of heat. The hippurate of quinidine crystallized from the cold neutral solution in long silky crystals, which had the appearance and shape of fern-leaves. It dissolves readily in water and in spirit of wine.

In comparing the formula for quinidine with those for quinine and cinchonine, the following relations are established:—

Quinidine	$C_{38}\,H_{22}\,N_2\,O_2$.
Quinine	$\begin{cases} C_{38}\,H_{24}\,N_2\,O_2 \text{ (Laurent).} \\ C_{40}\,H_{24}\,N\,O_2 \text{ (Liebig).} \end{cases}$
Cinchonine	$\begin{cases} C_{38}\,H_{24}\,N_2\,O_2 \text{ (Laurent).} \\ C_{40}\,H_{24}\,N\,O \text{ (Liebig.)} \end{cases}$

According to this quinidine differs from cinchonine by a lesser proportion of two atoms of carbon, whilst the equivalents of the other elements are the same. An homologous relation between these bases, which appears so very probable, cannot, therefore, be established.—*Ann. der Chem. u. Pharm., Mai*, 1852.

ON THE CAMPHOR-TREE OF BORNEO AND SUMATRA,

Dryobalanops Camphora, Colebr.

BY SIR W. J. HOOKER, D.C.L., F.R.S. AND L.S.

After the admirable account of the *Dryobalanops*, given by Dr. and Professor De Vriese in the *Nederlandsch Kruidkundig Archiff*, vol. iii., p. 1 (most kindly translated into English, and condensed by the accomplished daughter of that gentleman, Mademoiselle De Vriese (*Pharmaceutical Journal*, vol. xii., p. 22), any further notice might seem superfluous; but, while the memoir now alluded to was printing, we had the great satisfaction of receiving from James Motley, Esq., of Borneo, specimens of the rare plant itself (though only in fruit), and a noble sample of the trunk, laid open, with the crystals *in situ*, together with the camphor and oil in different states, and some notes on the locality and commercial value of the camphor. This valuable series of preparations is deposited in the Museum of Economic Botany of the Royal Gardens of Kew, and I am desirous now of laying some of the particulars communicated by Mr. Motley before the public as a little supplement to the very full memoir above alluded to.

"I have the pleasure of sending you," writes Mr. Motley from Labuan, May 12, 1851, "what I hope will be a novelty for your museum, a specimen of the '*Kassur Baras*,' or Camphor of the *Dryobalanops* in the wood. The specimen is part of a tree cut down here the other day, in clearing the ground for some of my colliery operations; it exhibits well the way in which the camphor is deposited from the so-called camphor oil, which filled the hollow of the tree. We saved about five gallons of it, and much was lost. I enclose a bottle of it in the same case, also a small phial of the white resin, yielded by the wounded bark of the living tree in small quantities only; unlike the *Shoreas* and other allied trees, which are, when old, frequently covered for some feet from the ground with a crust of resin. The little packet of seeds of an *Abrus*, or something of the sort, is always used by the natives to preserve the camphor, a few being placed in every packet; their supposed influence is of a magical nature, preventing, as it is said, the spirit of the camphor from flying away; it is usually packed in quantities of about a quarter of a pound in the leaf of some flabelliform palm, which I have not yet seen growing, and of which I cannot at the moment procure a sample. The specimen sent is valuable only from its being *in situ*, for as the drug is principally procured on the high mountains in the interior of Borneo, I have been unable to obtain such a sample of the fine white crystals, which are the most valuable in commerce, being just now, when cleaned and picked, worth about thirty dollars per catty, or about £4 15*s.* per lb. The present sample would be of much less value. It is sent only to China, where it is much valued, being used in medicine as a tonic and aphrodisiac, exactly the opposite qualities to those which we attribute to the *Laurus*-camphor. It is also much used for inflamed eyes, to which the Celestials are very subject, a small grain being from time to time placed under the lid. The smell is pleasanter than that of the ordinary camphor, and it does not become sublimed so rapidly in the air. The oil seems to consist of a very volatile essential oil, holding in solution a resin, which on a few days' exposure to the air is left in a syrupy state. It also yielded me a small quantity of crystallized camphor, on distillation with a very rough extempore apparatus. I have found it, by many trials on myself and others, to act powerfully and decisively as a diuretic in tiresome nephritic pains, to which we sojourners in the 'bowels of the land' are very subject, and it does not nauseate as turpentine frequently does on repetition. It is also here a popular remedy for rheumatism, being rubbed into the affected part. It is also a fragrant, quickly-drying, and well-bodied varnish, for which purpose I have used it largely. It requires rubbing until dry, like French polish. China is as yet the sole market, where it is used principally for embalming; its value here is about 20 cents (10*d.*) per bottle; in China about half a dollar. The resin is of no use, as far as I know, except that the natives are fond of applying it, as in fact they do almost every gum they pick up, to all sorts of cuts and wounds, which, as may be expected, hardly ever heal without a tedious sore. The timber of the *Dryobalanops* is very hard, dense, and difficult to work with a plane, is of a reddish hue when first cut, and very fragrant, but changing to a light brown; it bends readily, and is preferred by the Malays to all other woods for planking their boats. Upon some of the hills in Labuan, Camphor-trees form at least half the jungle; but the drug is rarely met with on this island, and, where most common, not one tree in twenty yields any;

hardly a tree of any size, however, is to be seen which has not been tried by cutting a hole in the side of the trunk. They are the noblest trees, not merely of our jungle, but the handsomest I ever saw; the trunk being very tall, round, and straight, furnished with huge buttresses at the base, and covered with a light brown, smooth, scaling bark; the head dense, well formed, and large for a jungle tree, the leaves very rigid and bright, and of a good dark green, and the fragrance of the beautiful white flowers most delicious. The fruit, though smelling most powerfully of spirits of turpentine, is greedily eaten by a small parroquet, of which I have sent home a specimen to Mr. Lewis Dillwyn of Swansea. I have observed that the leaves immersed in water very soon tinge it blue. The largest tree I have yet seen here was a *Dryobalanops*. The following were its dimensions:—

Height from the ground to the top of the buttresses	25 feet.
Girth at the root, following the buttresses in and out	333
Girth above the buttresses	8½
From ground to first branch	92
From ground to highest twigs	130

I have seen several higher trees, indeed I cut one 152 feet without a branch, but not one looking so huge as this, from the enormous size of its buttresses, which were like a great wall."

Again, June 13th, 1851, Mr. Motley is so good as to write further from Labuan:—"Since, by the last opportunity, I wrote you an account of the '*Kassur Baras*,' I have visited Borneo and have obtained some further information on the subject, and as I would not trouble you with a separate letter for such a trifle, I send it through my friend Mr. Lewis Dillwyn. The sample in the box sent, you must observe, is only prized so highly as I then stated when cleaned and picked. Very little would reach the highest value, though it is a very profitable kind to buy, having very little impurity mixed with it. It is bought from the natives by the Chinese merchants in this state, and it requires much judgment to buy it safely and to estimate by the eye the quantity of adulteration. To such an extent is this carried, that a Malay Nacoda of Borneo has the reputation of being able out of one catty of good camphor to manufacture sixteen catties which will pass muster with the inexperienced. When it comes into the hands of the merchants it is carefully washed; first with clean water to float the camphor away from the impurities, then with soap, and lastly with lime-juice and water; the soap destroying and the acid restoring its lustre and transparency. It is then sifted into three sizes, after which every crystal is carefully picked over and scraped if necessary, to clean off every particle of dark matter. These qualities are worth, respectively, about 35, 25, and 20 dollars per catty; the dark-coloured and nearly opake pieces, which are all separated, are slightly pounded and then again sorted to get out all that it is possible to procure, and the residue is worth about six dollars. The quantity exported from Borneo is about seven peculs per annum; it comes from Palawaw, the northern part of Borneo Sooloo, but about five-sixths of it from Barram; Singapore also receives large quantities from Acheen and other parts of Sumatra, and a good deal is carried direct to China from Sooloo and Magurdano, and the eastern coast of Borneo. It is consumed chiefly in China, but a good deal is also sent to Cochin-China, Japan, Laos, Cambodia, and Siam, and a small quantity to Burmah. Since I wrote to you I have had another and better opportunity of seeing it *in situ*, though in small quantity, and I think that it is not deposited from the oil, but that it is sublimed and crystallized in the upper part of the cavities, which are only partially filled with oil; this may be an exception, however, but it was the case in the only two trees I have seen while yet standing. The other specimens sent in the box were put in to fill up, and tell their own stories as far as I know. Should I have an opportunity of acquiring further information, and should it be worth your while to receive it, it will be a labour of love to me; for, with unfortunately very little knowledge, I have nevertheless an unquenchable love for all branches of natural history."

I have little to add to the early history or discovery of this camphor given by De Vriese. That author states that the first mention of it occurs in the "Eerste Schoepvart der Hollandsche Natie naar Oost-Indië, 1595-7,"—but, as will be seen by the quotation which heads this article, it was evidently known in the time of the great poet and traveller Camoens, who died in 1579, and whose "Lusiad" was published in 1572.

Our representation of the appearance of the crystals of resin is taken from a

portion of the block sent by Mr. Motley (the entire piece of wood with crystals in the clefts is 1½ foot long by 10 inches broad); but it will be observed that these are only intended to exhibit what they appear to the eye of the artist. Samples of crystals were sent for investigation, through the kindness of Dr. Percy, to H. J. Brooke, Esq., who writes to me—"I have lately received from Dr. Percy some crystals and fragments of a yellowish gum or resin, which I examined and measured, and then transmitted to Cambridge to Professor Miller; and I now enclose a figure or projection of the crystalline form as it would appear to an observer looking perpendicularly down upon it, if the faces were perfect and symmetrical. But the crystals are very far from being symmetrically formed, and from this circumstance the true form is not apparent, and it has been ascertained by measurement of the angles.

Fig. 1

Representation of the appearance of the crystals of the camphor on a portion of the block of wood (*slightly magnified: not intended to be mathematically correct*).

Fig. 2.

Diagram of a Crystal. "The primary form a right rectangular prism. The actual figure corresponds to the right rhombic prism of Haüy. There are other faces not yet investigated. Angles between normals to the faces; mm' 77.46; mr 52.49; ms 42.37; rr' 44.45; rr'' 56.29; ss' 102; ss' 37.28. These are supplements to the angles usually given. The figure has been drawn and the angles computed by Professor Miller."—*H. J. Brooke.*

"The crystals of mellite are modifications of a *square* prism, while those of this new gum are modifications of a *rectangular* prism.

"I think that crystals of a red gum have been found in Brazil wood, but I do not know their form.—Professor Miller remembers having seen the name of *Borneo camphor* in Frankenheim's 'System der Krystalle.'—I think it right to communicate to you all I can relative to this interesting substance."—*H. J. B.**

For the description of the genus and species of this tree I have only to refer back to p. 22 *et seq.*: the original paper is accompanied by an excellent figure (though there also *perfect* flowers are wanting), on folio size, and I should hardly have desired to publish one from our own specimens, could I have flattered myself that the valuable scientific journal in which De Vriese's paper has appeared had the circulation in our country which its merits deserve. Our fruit, not quite mature, but well preserved in alcohol, exhibits some slight differences from that of De Vriese. We find a nut, rather than a "three-valved capsule;" at least none of the pericarps of our specimen exhibits sutures or lines indicating dehiscence. In the forward state of our fruit we find one perfect large seed and five abortive ovules near its summit, all pendulous. Mr. Bentham, who kindly examined a fruit and compared it with the drawing, would define it thus:—"From an examination of the fruit it would appear to me evident that the ovary was three-celled, with two ovules in each cell collaterally affixed to the central axis and pendulum. As the fruit swells one ovule alone is enlarged so as to occupy the whole of the cavity, the dissepiments detach themselves from the sides, and, without growing, remain with the axis enclosed within the vertical groove of the seed, so as scarcely to be distinguishable from the testa; and the seed, as in many *Olacineæ*, although pendulous from the central axis, appears to be erect from the base of the cavity, and the five abortive ovules appear to be attached to the side of the seed."—*Hooker's Journal of Botany.*

[* The late Mr. W. Phillips examined a crystal of native camphor in the wood, in the collection of the Materia Medica at the College of Physicians, and thus described it: "The crystal of native camphor (in the wood) appears as a flat octohedron; but the primary form is a right rhombic prism of 51° 36′ and 128° 24′ by measurement with the reflective goniometer on cleavage planes; the octohedral appearance arises from the deep replacement of four of the solid angles of the prism by as many planes."—Paris's *Pharmacologia*, vol. ii., p. 133, 6th edit., 1825.—*Ed. Pharm. Journal.*]

ON ELASTIC COLLODION.

BY M. E. LAURAS.

Having made collodion the subject of a special study, and the object which I sought having been attained, I now communicate the good results I have obtained by the *modus faciendi* which I employ.

The important improvement to be made in this compound, which hitherto has not been of very frequent application in therapeutics, consisting in giving efficacy to it and in preventing the sufferings produced by its application on any portion of the body, and principally on the articulations which are much constricted after having been covered with it, an effect due to its want of suppleness and elasticity, and which the skin requires both for stretching and contracting.

By adopting the following formula, every inconvenience is obviated, collodion becomes easy of employment, and enables the patient to move without suffering pain:—

Sulphuric acid of sp. gr. 1.847 300 grms.; nitrate of potassa (very dry) 200 grms. Mix together in a stone-ware or porcelain pot, and add carded cotton, ten grms.

Leave in contact for twelve minutes; withdraw the cotton, wash it with cold water to remove the acid which it retains, and after two or three rinsings, immerse it in water containing thirty grms. of subcarbonate of potassa in solution in 1000 grms. of water; plunge it again into ordinary water, agitate well, and dry at a temperature of 77° to 86° F.

The cotton, thus prepared, takes the name of Xyloïdine, and may afterwards be mixed with the ether and the other substances which form it into elastic collodion.

Elastic collodion.—Xyloïdine 8 grms.; ordinary sulphuric ether 125 grms. Place in a wide-mouthed flask, and add alcohol of sp. gr. .825 8 grms. Agitate, and then make a mixture composed of Venice turpentine 2 grms.; castor oil 2 grms.; white wax 2 grms.; sulphuric ether 6 grms. Heat together the first three substances, add the ether, and combine the two mixtures.—*Repertoire de Pharmacie* and the *Chemist.*

LITHOGRAPHIC INK.

BY M. WEISHAUPT.

40 parts yellow wax.
10 parts mastic.
28 parts gum-lac.
22 parts Marseilles soap.
9 parts lamp-black.

The wax is to be heated until its vapour kindles on coming in contact with a burning match; it is then removed from the fire, and the soap, gum-lac, and mastic are added to it in small portions. The flame is then extinguished, and the lamp-black perfectly incorporated with it. It is again heated until its vapour can be ignited, when it is removed from the fire, and after the flame has been extinguished, it is poured upon a stone. The mass is then cut into pieces.—*Polyt. Central Blatt.*, 1851, p. 372, and the *Chemical Gazette.*

IMPROVEMENTS IN PREVENTING THE INCRUSTATION OF STEAM-BOILERS, &c.

(*Newton's Patent, enrolled Oct.* 15.)

The preparation to be used for preventing the incrustation of steam-boilers, and to which the name of "Sibbald's Metalline Compound" is given, is made by mixing together one pound of melted tallow or grease, one pound of finely powdered black lead, and two ounces of powdered charcoal. Additional fluidity may be imparted to the compound, when required, by the addition of half a pint of oil or gas-tar. This composition is to be heated, and applied with a brush like paint. Its use is also applicable to the preservation of metals and wood.

IMPROVEMENTS IN THE PREPARATION OF MADDER.

(*Kurtz's Patent, enrolled Oct.* 17.)

The object of this invention is to induce a fermentation of some of the constituent principles of the madder, and is effected as follows:—20 lbs. of crushed malt are first boiled with 100 gallons of water for from twenty to thirty minutes; the boiling is then stopped, and 45 lbs. of bran are added; the mixture is then well agitated, after which it is allowed to subside. The clear portion is run off, and the remainder filtered. 100 gallons of water are next added to each 60 or 65 gallons of the fermentative preparation above mentioned, and to the mixture an addition of 3 cwt. of madder or munjeet is made, the whole being well stirred for ten or fifteen minutes, until a perfectly homogeneous mass is obtained. The temperature of the water used should be sufficiently high to allow that of the mixture, previous to the addition of the madder, to be about 112° Fah. The resulting product is now allowed to remain until symptoms of fermentation appear; these are to be checked by repeated stirrings during fifteen or eighteen hours. The prepared madder, or munjeet, is then filtered, pressed, dried, and ground.

IMPROVEMENTS IN CHEMICALLY TREATING THE WICKS OF WAX CANDLES.

(*Smith's Patent, enrolled Nov.* 1.)

In addition to using plaited wicks in the manufacture of wax candles, the wicks are saturated with a solution of 4 ounces of borax, 1 ounce of chlorate of potash, 1 ounce of nitrate of potash, and 1 ounce of sal ammoniac, dissolved in 3 quarts of water; after which they are dried for use. These prepared wicks are to be used in candles formed of a mixture of wax and spermaceti, as well as those of wax only.

IMPROVEMENTS IN OBTAINING SILVER FROM THE RESIDUUM IN THE MANUFACTURE OF OXICHLORIDE OF LEAD.

(*H. L. Pattinson's Patent, enrolled Nov.* 1.)

In the manufacture of oxichloride of lead (as a substitute for white lead as a pigment), patented some time since by Mr. Pattinson, a residuum is obtained, which is found to contain a portion of lead mixed with earthy matter, and all the silver originally existing in the lead used in the manufacture of the oxichloride. The addition of an acid would effect the solution of some part of the lead, but as the whole of the silver as well as a portion of the lead would still remain unacted upon, Mr. Pattinson proposes in his new patent to smelt the residuum with common salt and granulated iron in a reverberatory furnace. The proportions used are one part of salt, one part of iron borings or filings, and four parts of the residuum. The melted materials are run into a mould of a conical shape; the lead and the silver settle to the bottom, and when cold may be broken off the mass, and the slag remelted on a common slag hearth.

IMPROVEMENTS IN SEPARATING GOLD AND SILVER FROM OTHER METALS.

(*Parkes' Patent, enrolled Nov.* 1.)

To separate gold from its admixture with lead, the patentee first smelts auriferous earth with the aid of the usual fluxes, and then melts the compound thus obtained with the addition of 22½ lbs. of zinc to each ton thereof, containing ten ounces of gold. The alloy of gold and zinc thus obtained is treated with an acid which dissolves out the latter metal, or the separation is effected by distillation with carbon.

To separate gold and silver from mixtures containing those metals, the patentee mixes from ten to thirty per cent. of lead or zinc, and five per cent. of chloride of ammonium or chloride of zinc, and one per cent. of carbon, with the metallic compound previously reduced to fine powder. The mixed ingredients are then placed in a gun-barrel, exposed to the heat of a suitable furnace, and set in motion for from five to ten hours, at the end of which an amalgamation of the metals is effected, when the gold and silver are removed by washing and subsequent cupellation.

IMPROVEMENTS IN OBTAINING METAL AND METALLIC PRODUCTS FROM THE RESIDUES OF CERTAIN PROCESSES.

(*Dr. Richardson's Patent, enrolled Oct.* 28.)

Where the residue consists of a mixture of the oxides of lead and antimony, or of lead and tin, as in the process for softening the hard lead of commerce, the patentee proposes to treat it with nitric or acetic acid, by which means nitrate or acetate of lead is obtained; after which the remaining oxide of tin or antimony may be reduced to the metallic state by any of the processes at present in use.

When the residue consists of a mixture of the oxides of tin and copper, as obtained by calcination of the waste alloys of these metals, the patentee submits them to the action of acetic or sulphuric acid, by which means acetate or sulphate of copper is obtained, which may be washed out, whilst the remaining oxide of tin may be reduced to the metallic state, or employed in the manufacture of muriate of tin or stannate of soda.

The patentee also effects the reduction of the mixed oxides of lead and antimony, by calcining them in a suitable furnace, with an admixture of one cwt. of coal and 28 lbs. of alkali to each ton of mixed oxides. If, however, the proportion of antimony present in the mixed oxides exceeds twenty to thirty per cent., he adds a proportionate extra quantity of alkali. The lead is thus obtained in the state of red oxide.

In operating on ores of lead containing sulphur, the patentee first expels the sulphur by calcining the ores in a reverberatory furnace by a gradually increased heat, after which their reduction is effected by the usual smelting process.

In calcining the residue of the distillation of zinc ores, according to the Belgian or Silesian processes, when mixed with matters containing lead and silver, the patentee uses a blast furnace, in conjunction with the injection of a fine spray of water, the residual products being collected and treated in the usual way.

THE SALE OF DANDELION COFFEE.

(*Correspondence.*)

"15, *Langham Place, Nov.* 22, 1852.

"My dear Sir,—The recent alteration in the Treasury minute, respecting the mixture of ground coffee with other ingredients, has led to some doubts as to the legality of the sale of a medicinal preparation called 'Dandelion Coffee.'

"This consists of the root of dandelion, or taraxacum, prepared and ground with a portion of coffee. It is recommended to patients as a convenient mode of taking dandelion, the flavour of which is so disguised by the coffee, that it is used as a beverage.

"I should feel obliged if you would inform me whether this preparation is included among the prohibited mixtures of coffee; and if so, how Chemists should act, when medical men prescribe dandelion coffee for their patients.—I am, my dear sir,

"Yours faithfully,

"Jacob Bell."

"To John Wood, Esq.,
"Chairman of the Board of Inland Revenue.

"*Inland Revenue, Nov.* 26, 1852.

"My dear Sir,—In such a case as you put, of Dandelion Coffee, used as medicine, our Board would not interfere.—Most truly yours,

"John Wood."

"To Jacob Bell, Esq.

TO THE CONVENTION OF PHARMACEUTISTS

Assembled at Philadelphia, October 6th, 1852.

The undersigned, a Committee appointed at the Convention held last year in New York, and instructed "to collect and receive such information as may be valuable, and memorials and suggestions from Medical and Pharmaceutical Associations, to be presented to the next Convention," respectfully report: That in the period that has elapsed since their appointment, notwithstanding the fact of their readiness to receive any communications having been duly announced, they have received no contributions towards the end or object of their appointment, except those relating to the inspection of drugs. They have, however, not been unmindful of the duty reposed in them, and now offer the following suggestions as tending to aid the business of the Convention, in so far as they exhibit some of the more prominent subjects worthy of its serious deliberation and action :—

1st. The number of Pharmaceutists, constituting the professional body in the United States, is large, comprehends all grades of qualification, and extends to every city and town in the country. The professed object of the present Convention being to adopt measures calculated to benefit this large body of citizens, in a professional point of view, by showing that there exist many grounds of sympathy between them, notwithstanding the present want of united action; we believe that the institution of a *National Association*, whose members may come from all sections of the body, is calculated to enlist this feeling of brotherhood, and direct its power, as a reforming force, towards the elevation of the average standard of qualification now existing. In view of this, it is suggested *whether* the passage of a resolution by this Convention, resolving itself into a National Association, should not properly engage its attention at its commencement, so that the important details of forming a Constitution, explaining the nature of its organization, &c. &c., might receive the deliberate consideration they merit, before being adopted.

As the basis upon which the Association will rest will be the decision as to what shall constitute a member, we believe its ultimate usefulness will very much depend on the character of this decision, and we cannot refrain from presenting some reflections on the subject.

The inefficiency or inadequacy of the present basis, viz.: Delegates from incorporated and unincorporated societies is here demonstrated by the small number who have been appointed in answer to the call; at least, this must be true so long as the process of local organization is so dilatory. The aim should be to enlist as much as possible of the talent now engaged in the pharmaceutical ranks.

We think, therefore, that Membership in the proposed Association should be of a representative character, to as full an extent as practicable. Colleges and Societies of Pharmacy should, of course, send delegates. Then provision should be made for the Apothecaries in cities and towns where no Society exists, whereby they may send representatives, to the extent of one for every ten Apothecaries in such places; each representative to bring with him a certificate from his constituents. Finally, to provide for the admission of isolated individuals, who may not have neighbours sufficient to entitle them to act as representatives, but who feel an interest in the Association; power should be given to the committee on credentials, under certain restrictions.

The formation of the Constitution, and the preparation of a Code of Ethics applicable to the present condition of the profession, sufficiently stringent to elevate the members above many things now too prevalent, and yet not so binding as to exclude a large number who, though well disposed, are unable to free themselves from participation in acts contrary to the highest standard, without a sacrifice greater than could be expected of them; should engage the wisest action of the Convention to render them practicable in their working.

2nd. The subject of *Pharmaceutical Education* is, in the opinion of this Committee, one of the greatest importance, and deserving of the consideration of the Convention, in several points of view. Indeed, the primary object of the Convention being called, was in reference to the improvement of the standard of practice throughout the country, and this cannot be effected without extending the present means of education, either by schools, or by an increase of facilities offered by proprietors to their apprentices and assistants. In too many instances the proprietors are ill fitted to extend the tuition that of right belongs to those whom they have engaged to teach the business of a Pharmaceutist. As schools of Pharmacy are of gradual growth, and cannot be expected to exist except in large cities, the Convention would do well

to consider what subsidiary means may be enlisted to reach those of our brethren who reside in small towns. One of the first of these collateral aids will be found in local organizations, embracing the proprietors in such towns where, by a union of their exertions and contributions, they may encourage Pharmaceutical literature by forming libraries, and uphold among themselves correct practice, the employment only of good drugs, and the receipt of fair prices.

In France, where but three Pharmaceutical Schools exist, there are such Societies in all the larger towns, which have halls and libraries, where their young men and apprentices have opportunities for gaining knowledge, and laboratories, wherein they occasionally perform operations not easily executed with the utensils and instruments usually found in shop laboratories. If such associations can be formed by the proprietors, they will soon influence the apprentices, and thus effect the object aimed at to a great extent.

The superior advantages of tuition in well conducted Schools of Pharmacy will not be doubted, especially when it is preceded by several years' shop practice. Access to these by young men at a distance can always be had where their circumstances enable them to attend, and thus finish their pharmaceutical education. The perfection of a School of Pharmacy is attained by attaching to it a practical laboratory, wherein the advanced pupils can have an opportunity to become familiar with the more difficult manipulations of Pharmaceutical Chemistry, and of extemporaneous Pharmacy. As yet, neither of the Schools in this country have this addition, which arises from the fact that the expense of conducting them renders their support by the fees of the pupils almost impossible. We think the voice of the Convention should be raised to encourage the formation of such schools, and also to advocate the practice of preparing chemicals in the shop laboratory.

3rd. The apprenticeship system which obtains in many parts of the United States, is a subject worthy of the consideration of the Convention. The conditions conducing to mutual advantage between the employer and the employed are not sufficiently attended to in general. Proprietors often do not consider the fitness of applicants, both as regards natural endowments and preliminary education, with that care and attention that a due regard to such applicants demands, and consequently a large number of inefficient apothecaries are entailed on the country—inefficient from lack of talent, or from disgust at a business for which they have no inclination. More attention to the claims of apprentices, on the *teaching* of their employers, should be advocated by the Convention as due to the former, as advantageous to the latter, and eventually to the profession.

4th. The Committee believe that the subject of *secret medicines*, or quackery, as applied to Pharmacy, together with the course usually followed by quacks in bringing their nostrums into notice, is becoming yearly more fraught with ill consequences, both to the consumers and the apothecaries, and merits the consideration of the Convention, as to whether the reference of the subject to a Committee to investigate, would not result in some advantage.

5th. The subject of the *inspection of imported drugs*, as regards the *actual* working of the law, is of deep interest to us all. The possibility of bringing the influence of this Convention to bear in regard to the continuance in office of able men, solely on the ground of fitness, is worth consideration. The usefulness of this law rests absolutely on the ability and conscientiousness of the Inspector, and if incumbents perfectly satisfactory to those concerned are removed, on political grounds, and replaced by inexperienced and unqualified persons, it is apparent that the good results of the law will cease.

Whatever may be the efficiency of the law against the importation of inferior drugs, it will not reach those *at home*, who are disposed to resort to adulteration as a means of increasing their profits. The power of the general government ceases with the Custom-house. It will be necessary, in order to reach this evil effectually, as far as it can be done, by legislation, to induce our State Legislatures and municipal authorities to authorize some form of inspection by which the delinquents can be reached; not the drug adulterator merely, but the medicine adulterator—the apothecary who scruples not to reduce the strength of standard medicines, that he may reduce his prices. Whatever may be the proper course of this Convention, we believe that eventually the National Association should urge, with all the force of its influence, the enactment of State laws tending to the reformation of these evils.

6th. The general adoption of our *National Pharmacopœia* as a guide in the preparation of officinal medicines, is much to be desired. We believe that this Conven-

tion should encourage its adoption, and should request the publishers of that work to issue a small sized cheap edition, so that every apothecary and physician shall have a copy. We also believe that a fruitful source of variation in the preparations of the shops, is the existence of a number of formulæ for the same preparation, as found in the British Pharmacopœias, parallel with that of our own code, in the Commentaries in general use.

7th. The *indiscriminate sale of poisons* by druggists and apothecaries is a serious evil in the United States, as at present conducted. Any views which may originate in the Convention, tending to abate this evil, would no doubt have some influence, if circulated by its authority.

8th. The separation of Pharmacy from the practice of medicine has long been effected on the continent of Europe, by the direct interference of the Government, each profession being in the hands of a distinct class of men. Inheriting, as we do, our Medical Institutions from Great Britain, the confusion of interests which has long prevailed there has in some measure descended to us; and many instances of medical practitioners conducting apothecary shops, like the so-called *apothecaries* of England, exist among us. The increase of this class, in some localities, has been marked of late years—a fact attributable to the undue multiplication of graduates in medicine, who, finding the ranks of their profession so full as to render prospect of immediate success doubtful, turn their attention towards Pharmacy, as a subsidiary means of support. As these mongrel apothecaries too frequently use their shops merely as stepping-stones to business, they tend directly to depreciate the standard of practice on the one hand, and tempt young apothecaries, who are struggling against the difficulties of an already excessive competition, to turn their attention to medical practice, with or without a diploma, as may suit their circumstances or fancy, on the other; and thus complicate the confusion. As Pharmacy never will advance as it should whilst this amalgamation exists in cities and towns to any large extent, we earnestly recommend to this Convention that a voice may go forth at its present session calling attention to this growing evil.

9th. Believing that if the Pharmaceutists of the United States are true to themselves, the meetings of the Association, of which the present may be considered the beginning, will annually increase in interest and importance, we would suggest, what must have occurred to many present, that they should be partially devoted to the advancement of Pharmacy, as well as to the sciences upon which it is based, by inviting contributions of original papers, and by committing subjects requiring investigation to suitable committees, who should report the results of their researches at the ensuing Annual Meeting, when, if they meet the approbation of the Association, it might direct their publication. Participation in the proceedings of such a gathering of their brethren would prove a powerful incentive to many Pharmaceutists, whose tastes lead them into scientific paths, to cultivate their talents by the pursuit of investigations fraught with usefulness to their profession at home, and with honour to it abroad.

And lastly, whatever may be the ultimate action of the Convention in relation to the subjects brought forward in this report, we would respectfully suggest that a full digest of its proceedings be directed to be published and largely circulated among the Pharmaceutists of the United States as calculated to do much good.

(Signed) William Procter, Jr. } Committee.
Samuel M. Colcord, }
Geo. D. Coggeshall. }

EARTHQUAKE IN THE WEST OF ENGLAND.

(*Extracted from a Letter from Dr. Hamilton.*)

The earthquake of the 12th of August was felt, I am informed, with still greater violence than it was in Cornwall, in South Wales, especially in Pembrokeshire; and I have obtained from Mr. Hearder the following notices of the places at which it was more or less distinctly felt here and in Cornwall.

"In Plymouth it was felt by individuals at Coxside Gas-works, in Athenæum Street, in Tavistock Place, &c., but with greatly diminished violence.

"Mr. Ambrose Barrat, of Tavistock, was in Wheal Fanny Mine (one of the Devon Great Consols), in the fifteen-fathom level, sitting with five other persons, and heard a rumbling noise like thunder, ran out to look at the weather, which was clear, and returned, and remarked the men and ground trembling, sat down, but felt as if raised from his seat, with a tremulous motion of the mine, which lasted about a minute and a half. He subsequently descended to a lower level, and found the workmen so much frightened at the idea that the mine was falling in, that they had removed to another part of the level. In Wheal Maria (also near Tavistock), in one of the levels men were working in 100 fathoms to the north of the shaft, and there the concussion was so great, that they thought the shaft had fallen in, and ran to see what was amiss. In Tavistock, bottles in the shop of MM. Edgecombe and Stannes, Druggists, jingled together; and at Walkhampton the hammer struck the bell of the clock from the effect of the vibration.

"Captain Dunstan states that the shock was more particularly felt in Caradon mines at the 140-fathom level, or bottom of the mine. The sound was like distant thunder, and the shock was tremendous, producing the greatest consternation among the miners.

"The driver of the Falmouth coach, on the Liskeard road, says it rocked like a boat."

Mr. Mitchell, the talented landscape painter, was in bed at Calstock when the shock took place, and felt his bed rock with it; the accompanying noise, or ground thunder, as it is emphatically termed in the West Indies, he compared to that of tearing paper, but says it exceeded that of the loudest thunder tenfold. The shock was felt as far east as Collumpton. The eruption of Etna followed at an interval of eight days. The earthquake at Cuba after the same interval, and that of Jamaica two days later. The earthquake in Lancashire, North Wales, and Ireland, followed that of the 12th of August at a distance of eight or nine days, and simultaneously three smart shocks were felt at Malaga. All evidently the results of the same internal commotions which do not appear to be yet at an end. May there not be some connection between these internal disturbances and the meteorological state of the atmosphere so remarkable at present?

14, *Octagon, Plymouth.*

[We have heard it remarked, in connexion with the above subject, that two full moons occurred in last July, a circumstance which, it is said, had not previously happened since the year 1776; in which year we find, on referring to some old magazines, that parts of the country were much flooded, and that a shock of earthquake was felt at Canterbury, Sandwich, Ashford, and all over East Kent. Its direction was from south to north, and it lasted about eight seconds, being accompanied by a rumbling noise, the shaking of crockery, the ringing of bells, &c.—Ed.]

PHARMACEUTICAL EDUCATION.—MEANS TO THE END.

BY MR. HENRY SCHOLEFIELD.

The present position and prospects of the Pharmaceutical Society are deeply interesting to those who have the success of such an institution at heart. A Charter of Incorporation has been obtained and an Act of Parliament passed embodying its principles, and after a short lapse of time the only means of admission into membership will be by passing an examination which shall test the qualifications of the candidate. That membership in the Society will be esteemed a privilege, increasing in value year by year, is becoming more and more evident. It is, therefore, very desirable that every facility should be afforded to the rising generation for obtaining that knowledge which shall enable them, as they finish their term of apprenticeship to the trade, to obtain their scientific diploma. With the co-operation of the principals, it is pretty clear that in London and the larger provincial towns means are easily available for this purpose, but an extended survey of the subject shows the necessity of some system which shall be applicable to the great body of Chemists and Druggists scattered throughout England and Scotland. As the present Members pass away and the rising generation fill their posts in trade, it is most important that they should likewise take up their membership. If this is only to be attained by following the example of the medical student, in devoting a period of even twelve months to practical study in London, it is a sanguine expectation to look forward to

the Society being maintained on an extensive scale by such means, and unless the Society be supported by membership on an extensive scale it will never command the position which it is desirable it should do, nor realise the ambition of its present ardent supporters. The staple source from which the requisite knowledge is to be obtained undoubtedly consists in the treatises upon the different subjects of Chemistry, Pharmacy Materia Medica, and Botany, and these are equally available to the resident in a village and the metropolis; but without some auxiliary assistance, either in the form of a private instructor or by public lectures, it is most commonly the case that a very imperfect practical comprehension of such works is realised. The proportion of able, and, at the same time, willing private instructors in the principals of the present day, is too small to be calculated on for the purpose in view. Public lectures present the most palatable form of obtaining instruction, presenting the pith of the matter illustrated in a way calculated to impress the memory with the leading facts, which can be elaborated by private study. Association, too, gives a great zest to the pursuit of any kind of knowledge, and it is therefore to the subject of lectures that these remarks are intended to have especial reference.

As has been previously remarked, the opportunity of attending courses of lectures is limited to residents in our larger cities and towns, and in many of these places the lectures are not especially framed for the Pharmaceutist, but are grafted upon courses for medical students, and do not embrace much practical study in Pharmacy. The lectures, as delivered in Bloomsbury Square, are undoubtedly those which are best adapted for the Chemist and Druggist; they are expressly arranged to meet his requirements, to the exclusion of matter which rather confuses than assists the clear comprehension of that which it is requisite to know. This being admitted, it must be very desirable that all should attend the lectures in Bloomsbury Square; but, whereas, it is impossible for the bulk of those to whom we refer to go there, the next consideration is whether these lectures cannot be made portable, so as to be heard in every district of the country. Such a plan is surely feasible enough, with sufficient support to carry it out.

A lecture actually consists of little more than reading a manuscript and illustrating it in its course; and by the assistance of a reporter, who in addition to the matter of the text, should describe in marginal notes the experiments performed, with a sketch of the apparatus used, and the specimens exhibited, I can see very little difficulty of such lecture being repeated in Edinburgh, even by a moderately qualified man. It is merely a matter of pounds, shillings, and pence, which, with an extensive demand, would become a very limited affair. Suppose our professors were each to reduce their lectures to such a practical form as is referred to above, and have them published, we think there are few towns where some one would not be found, gratuitously, or for a trifling remuneration, competent to rehearse and illustrate such lectures, which I think would be eagerly sought after and supported. If a list were subjoined to each course of all the apparatus, specimens, charts, and materials of illustration required, there would be no difficulty in finding parties willing to supply the whole of suitable character and at fixed prices. A course on one subject might be had at a time.

If these suggestions meet with a general response, suppose a course on Chemistry and Pharmacy were to be published by way of experiment; but as this, so far as a book is concerned, must be arranged by previous subscription, it would be desirable to estimate the cost on a scale graduating with the number of copies, and then by a general appeal see how many subscribers would come forward to join in the speculation.

There is no doubt that an attendance at Bloomsbury Square, where there is the finest museum of the kind in the world, and where there is an opportunity for practical study in the Laboratory, would be of infinitely greater value than the system here proposed; but as "half a loaf is better than no bread," so I think to those who are precluded from availing themselves of London attendance, would a recitation of the lectures delivered there be hailed as a considerable boon, and awaken a lively interest in the pursuit of a deeper and more practical insight into what are now to many of them hidden mysteries.

Thus the Society might be reinforced on an extensive scale by candidates from all quarters, and its object be triumphantly realized.

South Shields, Nov. 17, 1852.

BOOKS RECEIVED.

An Essay on the Action of Medicines in the System; *being the Prize Essay to which the Medical Society of London awarded the Fothergillian Medal for* 1852. By Frederick William Headland, B.A., M.R.C.S, &c. London: John Churchill, Princes Street, Soho. 8vo, pp. 346. 1852.

Pulmonary Consumption and its Treatment. By Willoughby Marshall Bucklem, M.D., Licentiate of the Royal College of Physicians, Senior Physician to the Blenheim Dispensary. London: John Churchill, Princes Street, Soho. 8vo, pp. 160. 1852.

Reports made to the Directors of the London (Watford) Spring Water Company, *on the Results of Microscopical Examinations of the Organic Matters and Solid Contents of Waters supplied from the Thames and other Sources.* By Edwin Lankester, M.D., F.R.S., and Peter Redfern, M.D., F.R.C.S.L. Together with a Chemical Report on the Quality of various Specimens of Water from Chalk Springs near Watford. By Thomas Clark, M.D., and John Smith, M.D. 1852.

A Letter to the Local Board of Health of the City of Durham, *in Reply to a Letter from Mr. William Lee, one of the Superintending Inspectors of the General Board of Health.* By Charles May, F.R.A.S. W. S. Johnson, St. Martin's Lane. pp. 14.

The Quarterly Journal of Microscopical Science, from the publishers. To be noticed next month.

TO CORRESPONDENTS.

A Reader (Blackburn).—Chromic acid.—100 measures of a saturated solution of bichromate of potash are mixed with 150 measures of oil of vitriol, and the whole suffered to cool. The chromic acid crystallizes in brilliant crimson-red prisms. It is soluble in water.—Fownes.

J. B. (Liskeard).—The lime-juice used in her Majesty's service is identical with lemon-juice.

An Apprentice (Spilsbury).—(1.) Milk of roses, vol. iii., p. 116.—(2.) Spiritus myristicæ should be made by distillation, according to the Pharmacopœia, and not from the oil.

Investus (Alnwick) should study the Pharmacopœia and elementary works on Chemistry, Materia Medica, and Botany, repeatedly recommended in our previous numbers.

A. Bothwell (Plymouth).—Syrupus ferri superphosph.—Superphosphate of iron, ℈ij; simple syrup, f℥viij.—Mr. Greenish.

W. H. T. H. (Wellington).—We are not acquainted with the substance called "cervacrol."

Mr. James Brett (no address) should apply personally or by letter to Mr. Redwood for an answer.

Adjutor (Leicester) will observe that the regulations published in this number will meet the circumstances of the cases to which he refers.

Chemicus (Holywell).—See vol. viii., No. 7.

H. R. W. (Bath).—The nature of the three examinations is pointed out in vol. viii., No. 7.

Juvenis (Plymouth) makes the following practical observations on the education of Apprentices:—"In many of our large towns of Devon, the Chemists carry on an

oil and colour trade combined with that of a Chemist. In this part of the business the apprentices are kept for perhaps half their term. The Chemist has no laboratory, no retorts—perhaps never used one while he has been in business—he has a very small stock of medical or chemical books; then I ask, what can the apprentice learn? He may sell Epsom salts and dispense medicines for ever, and yet not know how those medicines are made, what they are composed of, or where they come from. My belief is, that on an apprentice first entering his master's shop, instead of having the sweeping brush put into his hands the Pharmacopœia ought to be the first thing, or the pestle and mortar. When a boy goes to school he is not expected to sweep the room or clean the glass, but the apprentices in many places have it to do. No doubt the examination of Chemists will be a fine thing; the apprentices will now be obliged to study if they ever intend to be masters. I have heard that some will not take Assistants unless they have passed an examination, which I think is not a bad plan. Those who are apprenticed to a Chemist should follow up their studies after they are out of their time, and remember that their parents or guardians have paid a great premium, which would be a dead loss unless they qualify themselves."

We have to thank Mr. Francis for his letter, but think it needless to revert to the subject. The individual referred to only wanted an excuse for puffing himself by sending his book to Chemists and others throughout the country.

J. S. (Devonport) observes, "I am much pleased with Dana's Mineralogy, yet wish to observe how much it would aid the English student in gaining practical knowledge of minerals, if British were added to American localities."—[We quite agree with our correspondent].

A Constant Reader.—In fusing hydrate of potassa a silver vessel should be used if it is desired to have a colourless product. The common hydrate of potassa of commerce is made in vessels of iron, this metal being that alone, with the exception of silver, that can be advantageously used for the purpose. The colour of common *Potassa fusa* is derived from the iron vessels in which it is made.

An Associate (Bristol).—(1.) Crystals of chrome alum keep very well if they are perfectly dried, and the surfaces rubbed with a cloth slightly impregnated with oil.—(2.) The question does not admit of a general answer, nor have the changes referred to been sufficiently investigated, that we are aware of, to afford any specific information.

Ignoramus.—(1.) We believe no such tables as those referred to have been published in a separate form.—(2.) The number of atoms of water represent the atoms of base required to form a neutral salt.—(3.) The question cannot be answered in the space at our disposal.—(4.) An Assistant, if twenty-one years of age, may pass both Minor and Major Examinations, but would be admitted a Member only on going into business on his own account.

G.—(1.) Carbonate of potash is not bicarbonate. The quantity to be used for purifying spirit from amylic alcohol is not material. The spirit may be decanted off and then distilled.—(2.) The term "Liq. Donovan." is not explicit. It probably means Donovan's Liquor Hydriodatis Arsenici et Hydrargyri.—(3.) It is a very simple question of calculation.

We received too late for insertion in the Liverpool Transactions, a notice of a Lecture, on November 26, by Mr. John Pridham, on the Progress of Pharmacy in the United States during the last ten years.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. CHURCHILL, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XII.—No. VIII.—FEBRUARY 1st, 1853.

THE DECEASE OF DR. PEREIRA.

It is impossible to estimate the loss the profession has sustained by the decease of Dr. Pereira, who died on Thursday, the 20th of January, in his forty-ninth year. A few weeks previously he had a serious accident, having fallen down stairs and ruptured the rectus muscles of both legs just above the patella. This had confined him to his bed, but did not appear to have materially injured his general health, and he was progressing favourably towards recovery, when an unforeseen event suddenly terminated his life. He had been on that day wheeled into the next room on an easy chair, and about ten o'clock, on retiring to bed, which in his helpless condition required a considerable muscular effort, he suddenly fell back, exclaiming that he had ruptured some vessel about his heart. Three medical men were in attendance within about a quarter of an hour, but the case admitted of no alleviation, the Doctor himself was sensible from the first that nothing could be done to relieve him, and he expired at half-past ten.

We cannot, on the present occasion, give a notice which would do justice to the memory of so distinguished a member of the profession. His indefatigable perseverance and energy in the pursuit of science, and especially his favourite study, Materia Medica, had placed him at the head of his department in the profession. As an authority in Materia Medica he was without a rival in this country—we might say in Europe. The Pharmaceutical Society is greatly indebted to Dr. Pereira for his constant exertions on its behalf, and his readiness at all times to promote its objects by the contribution of papers, and by every other means in his power. It is much to be regretted that the remaining portion of the present edition of his great work on Materia Medica was not completed; although we believe it is in a very forward state.

We intend to give a more detailed notice in a future number.

THE ORGANIZATION OF PHARMACEUTISTS IN AMERICA.

Our number for December contains the report of a committee appointed at the Convention, held at New York in the previous year, and presented to the Convention held at Philadelphia, Oct. 6th, 1852. The persevering exertions of the Pharmaceutists in America, which we have noticed from time to time, have led to an important and satisfactory result, from which a complete organization and reformation of the profession of Pharmacy may be anticipated.

In the absence of any laws to regulate the qualifications, or influence the conduct of Pharmaceutical Chemists, various abuses prevailed which reflected disgrace on the profession. The Colleges of Pharmacy in Philadelphia and New York are the sources from whence the reform originated, and their influence is gradually spreading throughout the country. These institutions commenced by providing the means of scientific instruction for Pharmaceutical students, and establishing a class of graduates in Pharmacy, whose superior qualifications obtained for them a corresponding status in public estimation, and this served as an inducement to others voluntarily to pass through the same ordeal. As the number of graduates of these colleges increased, the importance of Pharmaceutical education became more generally understood and appreciated; institutions having similar objects were established in other places; and a correspondence was opened, which resulted in a Pharmaceutical Convention, the object of which was to consider what steps should be taken for the purpose of raising the standard of qualification of the members of the body, and establishing Pharmacy as a branch of the profession. The law passed by the American Congress in 1848, appointing inspectors of the drugs imported into the country, acted as a stimulus to further exertion, by directing public attention to the necessity for reform, and a supervision of the imports, as a check upon fraud.

At the last meeting of the Convention (Oct. 1852), the Report above referred to was presented, and in pursuance of the recommendations it contained, a resolution was passed, constituting a permanent Association, under the title of "The American Pharmaceutical Association."

In the discussion which took place on this important measure, some difference of opinion at first prevailed respecting the line to be drawn in the admission of members. On one side it was urged, that the members of the Association should come from organized societies as far as practicable, and that a representative basis should be aimed at, even where no organization exists, by requiring every Member to bring credentials from the practising Apothecaries. On the other side a more liberal basis was recommended, taking into consideration the present condition of Pharmacy in the United States, and it was thought that the door should be thrown open to all Apothecaries and Druggists who should bring certificates of their good standing at home, and who were willing to sign this Constitution and Code of ethics. The latter view of the case, with a slight modification, was ultimately adopted. Several committees were appointed, and the following resolutions among others were passed :—

"Resolved, that the whole subject of the inspection of drugs be referred to a committee, who shall be instructed to confer with the examiners, and endeavour to arrive at some practicable means of fixing standards for imported drugs."

"Resolved, that in the opinion of this Convention, the law against the importation of adulterated drugs, chemicals, and medicinal preparations, has already effected much good, by excluding large quantities of inferior drugs from the market."

"Resolved, that inasmuch as the usefulness of this law will be proportioned to the ability and conscientious discharge of the duty of examiners, that this Convention shall respectfully and urgently represent to the appointing power, the cardinal importance of preventing the removal of qualified examiners on mere political grounds."

"Resolved, that the subject of the indiscriminate sale of poisons, as now conducted by Apothecaries, Druggists, and others, as regards the practicability of effecting some useful reform in the present state of the traffic, be referred to a committee of four members, to report at the next annual meeting."

"Resolved, that a committee of three members be appointed to take into consideration the whole subject of secret or quack medicines, and report at the next annual meeting the result of their deliberations, whether any course can be suggested by which the Association may act efficiently in abating this great evil."

The following resolutions, declaratory of the sentiments of the Convention brought forward by the business committee, were read and adopted :—

"Resolved, 1st. That this Convention earnestly recommends to the practising Apothecaries in all sections of the United States, in places where they are sufficiently numerous, that they should organize themselves into societies for mutual improvement as Pharmaceutists, for the encouragement of Pharmaceutical literature, by the formation of libraries, and for the adoption of rules of conduct calculated to elevate the character of the profession among them."

"2nd. That as schools of Pharmacy are the most effectual aids to the student, this Convention respectfully recommends to Pharmaceutists, in all cities where they are numerous, to take measures for the establishment of such institutions, as powerful means of improving the education of their assistants and apprentices, and thus benefiting themselves and the public."

"3rd. That this Convention also recommends, that more attention be given by proprietors to the claims of their apprentices or assistants who are in course of study, as regards the facilities for learning, and the tuition which of right should proceed from them [the proprietors] in the absence of schools of Pharmacy, especially in the provision of the best books of reference on the several subjects that claim the attention of students of Pharmacy."

"4th. And that, in the opinion of this Convention, it is desirable that Apothecaries should be more generally careful, in taking pupils or apprentices, in reference to their fitness, as regards natural endowments and preliminary education, believing that many persons who are now engaged in Pharmacy, and unfitted for its duties, might thus have been prevented from misapplying their time and abilities in a profession for which they are not calculated."

The preamble of the Constitution was then read and adopted, as follows :—

"*Whereas*, The advancement of pharmaceutical knowledge and the elevation of the professional character of Apothecaries and Druggists throughout the United States, are objects that are dear to us in common with all well-disposed Pharmaceutists ; and *whereas* a large portion of those in whose hands the practice of Pharmacy now exists, are not properly qualified for the responsible offices it involves, chiefly by reason of the many difficulties that impede the acquirement of a correct knowledge of their business ;—

Therefore, We, the members of a Convention, now met at Philadelphia, composed of Apothecaries and Druggists from different sections of the Union, and from all the Colleges and Societies therein existing with the object of deliberating on the condition of our profession, do hereby resolve and constitute ourselves into a permanent association, to meet annually at such times and places as may hereafter be determined, for more effectually accomplishing the objects for which we are now assembled ; and do now adopt the following

CONSTITUTION.—Section I.

This Association shall be called "The American Pharmaceutical Association."

Section II. *Of the Members.*

Article I. All Pharmaceutists and Druggists who shall have attained the age of twenty-one years, whose character, morally and professionally, is fair, and who, after duly considering the obligations of the Constitution and Code of Ethics of this Association, are willing to subscribe to them, shall be eligible for membership.

Article II. The members shall consist of delegates from regularly constituted Colleges of Pharmacy, and Pharmaceutical Societies, who shall present properly authorized credentials, and of other reputable Pharmaceutists feeling an interest in the objects of the Association, who may not be so delegated, the latter being required to present a certificate signed by a majority of the delegates from the places whence they come. If no such delegates are present at the Association, they may on obtaining the certificates of any three members of the Association be admitted, provided they be introduced by the committee on credentials.

Article III. All persons who become members of this Association shall be considered as permanent members, but may be expelled for improper conduct by a vote of two-thirds of the members present at any annual meeting.

Article IV. Every member in attendance at the annual meetings shall pay into the hands of the Treasurer the sum of two dollars as his yearly contribution.

Article V. Every local Pharmaceutical Association shall be entitled to five delegates.

Section III. *Of the Officers.*

The officers of this Association shall be a *President*, three *Vice-Presidents*, a *Recording Secretary*, a *Corresponding Secretary*, a *Treasurer*, and an *Executive Committee* of three, which may include any of the members except the President, all of whom shall be elected annually.

Article I. The President shall preside at the meetings and preserve order. He shall nominate all committees, except a majority of the members present direct a resort to balloting or other means. He shall sign all certificates of membership, approve of all foreign correspondence, and countersign all orders on the Treasurer drawn by the Executive Committee. And he shall at least three months previously to the annual meeting publish a call in all the Pharmaceutical and in such Medical and other Journals as he may select, stating therein the objects of the Association and the conditions of membership.

Article II. In case of the temporary absence, or inability of the President, his duties shall devolve on one of the Vice Presidents.

Article III. The Recording Secretary shall keep fair and correct minutes of the proceedings of the Association. He shall keep a roll book of the members, and see that it is corrected annually, and he shall furnish to the Executive Committee a correct transcript of the minutes of the meetings for publication in the Transactions of the Association.

Article IV. The Corresponding Secretary shall attend to the official correspondence directed by the Association with other bodies, or with its members, all of which correspondence shall be approved by the President.

Article V. The Treasurer shall receive and take care of the funds of the Association ; shall pay its money only on the order of the Executive Committee,

countersigned by the President; and shall present a statement of his accounts annually, that they may be audited.

ARTICLE VI. The Executive Committee shall take charge of the publication of the proceedings of the Association, including such papers on scientific subjects as it may direct to be published; attend to their distribution; pay the expenses incurred on behalf of the Association at its meetings or in the interim, and report a statement of their transactions to the next meeting.

SECTION IV. *Of the Meetings.*

ARTICLE I. The meetings shall be held annually, at such time and place as shall be determined at the adjournment of the previous meeting, observing that no two meetings shall be held consecutively at the same place.

ARTICLE II. The meetings shall be organized by the President of the previous year, or, in his absence, by either of the Vice Presidents in the order of their election, or, in their absence, by the Recording Secretary, who shall act *pro tempore* until the nomination and election of officers for the session.

ARTICLE III. Immediately after the temporary organization of the Association the roll shall be called, when a committee on credentials shall be appointed from the *members* present, to whom the certificates of delegates shall be submitted, and who shall examine the claims of all other applicants for membership before they are submitted to the Association.

SECTION V.

This Constitution may be altered or amended by a vote of three-fourths of the members present at any regular meeting, and notice to alter or amend the same shall be given at least one sitting before a vote thereupon.

THE ADULTERATION OF DRUGS.

THE second and third volumes of this Journal contain a series of articles by the late Mr. Richard Phillips, entitled, "Illustrations of the present State of Pharmacy in Great Britain," in which the author gave the result of the examination of numerous samples of drugs and chemicals purchased at different shops. He directed attention to some inaccuracies and adulterations which were prevalent at that time, selecting, as examples, nitric, hydrochloric, and acetic acids, carbonate, tartrate, and hydrate of potash, liquor potassæ and liquor ammoniæ, sulphate of soda, spirit of nitric ether, aromatic spirit of ammonia, ammoniochloride of iron, iodide of potassium, nitrate of silver, sulphuric ether, and a few others.

Mr. Phillips introduced his observations by an allusion to the evidence given by himself before a Parliamentary Committee, in 1834, to the effect that "certain medicines, procured from the most respectable sources, were deficient both in purity and strength," and quoted the opinion of Dr. Christison, published in 1838, in favour of a system of inspection of the shops of Chemists and Druggists. Referring to an observation in this Journal, vol. i., page 505, on the provisions of a proposed Medical Reform Bill, in which it is stated that "the Chemists and Druggists, having undertaken to reform themselves, will be allowed to proceed unmolested in their laudable undertaking," Mr. Phillips declared it to be his intention "to adduce evidence as to the extent of the existing evils, leaving others to determine the most eligible process for eradicating them."*

In his concluding paper† he made the following observations:—

"I have now concluded the 'Illustrations of the State of Pharmacy'—at least for the present; and I trust that I have amply proved that its condition is such as ought to excite every branch of the medical profession to endeavour to procure its improvement.

"I submit the evidence which I have collected to the consideration of the Pharmaceutical Society, hoping, that among its own members at least, it will effect the reformation which the public safety so urgently demands.

"I have stated that I discontinue the illustrations for the present; and I do so with the intention of resuming them when a sufficient time may be supposed to have elapsed for remedying the existing delinquency, whether arising from carelessness, ignorance, or fraud."

* Vol. ii., No. 5, Nov. 1842. † Vol. iii., No. 5, Nov. 1843.

These strictures had the effect of directing attention to the subject, and many Chemists were induced to examine the purity of the drugs and chemicals which had been selected as examples, as well as some others which were found to be defective. Among the latter we may mention precipitated sulphur, prepared calamine, and oxide of zinc. A paper by Mr. Redwood,* read before the Society, January 11, 1843, contained the result of an examination of the oxide of zinc usually sold, from which it appeared that it was almost invariably contaminated with carbonate, sometimes to the extent of twenty-five or thirty per cent., and that in some instances it contained basic sulphate. The manufacturers accordingly took care to remedy the defect, and a pure oxide of zinc was afterwards obtainable by those who thought proper to purchase it. Still, however, a demand for the impure oxide continued, as it was preferred by some on account of its being cheaper and whiter than the pure. Pure milk of sulphur was also more extensively prepared, and the compound previously sold under that name has been gradually going out of fashion.

Mr. Phillips did not resume his "Illustrations of the State of Pharmacy;" the subject of adulterated drugs has passed into other hands, and is now being used as a stalking-horse by two rival editors. The editor of the *Lancet* has for some time past kept the dealers in pickles, grocery, and other articles of food in a state of bodily fear by the disclosures contained in the reports of his "Analytical Sanitary Commission," and has now directed his scrutinising investigation to drugs and pharmaceutical preparations. The *Medical Times and Gazette*, having taken the cue from the *Lancet*, is going over the same ground, and the number for January 15th contains the first series of exposures. The editor of the *Lancet* appears to consider that his contemporary is poaching on his manor, and in allusion to this undertaking, emanating from a quarter previously hostile to such proceedings, observes,

"A fair acknowledgment of the value of a work, projected by an individual to whom their selfishness is opposed, is to them an impossibility; but it is natural for them to be low, vulgar, and mean; consequently, after having abused and vilified in vain, their hostility takes on a new form, and displays itself in a servile imitation. A labour that could not be checked by invective, clamour, and misrepresentation, becomes imitated by its assailants."

It matters little to the partridges on the first of September whether they are to be shot by poachers or by regular sportsmen, and the question at issue between the two editors is equally unimportant to the victims of their lash. It is sufficient for us to know that a crusade has been commenced by two self-constituted inspectors of drugs, who are vieing with each other in the rigour with which they perform the task they have undertaken. That such an investigation, if conducted in a fair and proper spirit, is likely to be attended with a beneficial result, we shall not pretend to dispute. Many, if not most of the inaccuracies referred to, arise from inadvertence, and when pointed out, may be easily avoided. In cases where a wilful and systematic fraud has been practised, its exposure is a public duty, and the offenders have no right to complain.

Mr. Phillips, in his illustrations, abstained from personal allusions; he mentioned no names, but confined himself to a statement of facts, leaving the delinquents to profit by the hints and rectify the abuses. While proving the existence of impurities or inaccuracy, he at the same time referred to the tests and the mode of purification, thus encouraging each Chemist to examine his preparations himself, in order to ascertain whether or not he was implicated in the charge. The manufacturers were docile and pliable as they usually are, for it will generally be found that manufacturers regulate their products by the demand. If a pure preparation be wanted, it is only necessary to let the fact be known, and it may be had; but so long as purity is not appreciated, the manufacturer pursues the beaten path, sells at reduced prices, and "gives satisfaction to his customers," which is the primary aim of men of business.

The example of Mr. Phillips, in avoiding personal attacks, is not followed by

* Vol. ii., page 566.

his successors, who publish with each analysis the name of the Chemist at whose house the sample was purchased. These reports are in some instances calculated to convey an unfair and erroneous impression; for example, in the *Medical Times and Gazette*, precipitated sulphur is selected for examination, and several Chemists of the highest respectability, as well as the Apothecaries' Hall, are shown up as vendors of a preparation containing about fifty per cent. of sulphate of lime. Now, it is well known that two kinds of milk of sulphur are kept by Chemists, the *pure*, which is used for dispensing, and sold to those who prefer the best; and the *common*, or commercial milk of sulphur, which some people *will* buy in spite of all remonstrance.

It might be inferred from the Report, that some of the Chemists whose names are mentioned keep the pure milk of sulphur, and others the impure, whereas it is most likely the fact that all keep both kinds, and that a misunderstanding occurred in the purchase of some of the samples, as to which of the two was required. If common milk of sulphur were asked for, the common would in most cases be supplied. Some customers, even after having been told that it contains half its weight of sulphate of lime, persist in taking the common—because it looks whiter and nicer, they have been accustomed to take it, and it is only half the price of the pure kind. This prejudice may, however, be overcome by perseverance, and in some shops the impure preparation has become obsolete in consequence of the repeated defamation of its character. The next object of research was sublimed sulphur, which was found unadulterated. The subjects named in *The Lancet* are opium and laudanum, but at the time of writing we have not seen the article.

In conducting these investigations it should be borne in mind, first, that in many cases two or more qualities of the same drug or preparation are kept, and sold each in its own character and at corresponding price. With regard to others, the retailer is dependent on the foreign producer or British manufacturer, and however scrupulous some may be, they are liable to imposition, and may unawares be implicated in the sale of an impure drug, although the best they could obtain. Again, some drugs and preparations do not admit of easy analysis, and must be judged of chiefly by their physical characters, and it is not every Chemist and Druggist, however honest he may be, who is capable of conducting an analysis by which to determine the degree of purity of medicines. For these reasons justice demands great care and circumspection in publishing the result of an inquiry of this delicate nature. The progress of education will tend to diminish the existing imperfections by increasing the number of those who are capable of distinguishing genuine from inferior or adulterated medicines, and the occasional publication of a few deviations from the instructions of the Pharmacopœia will serve as a stimulus to Chemists to take advantage of their improved qualification. If in the course of the reports of these investigations any unfair statements should be made, or unjust inferences drawn, we shall take care to notice the fact.

We subjoin an extract from a recent report of the Inspector of Drugs in New York, which serves to show at the same time the extent to which the systematic adulteration of drugs is carried on, and the effect of the means adopted in America for its prevention.

EXTRACT FROM REPORT OF THE INSPECTOR OF DRUGS, NEW YORK.

BY M. J. BAILEY, M.D.,

Special Examiner of Drugs, Medicines, Chemical Medicinal Preparations, &c.

As an evidence of the beneficial effects of the wise sanitary measure, in the success of which we have all taken so much interest, I am pleased to say, that the character and quality of the more important articles of drugs, medicines, and chemical preparations, connected with medicine at present presented for entry from abroad, is greatly improved, and of a far higher standard of strength and purity than formerly; notwithstanding, as will be seen, I still have occasion to apply the "veto power"—a labour of love, which must of necessity be performed in order to arrest the unhallowed strides of deception and fraud which will ever be practised to

a greater or less extent, as long as we have those among us, engaged in any department of the drug trade, who to put money in their purse, would endanger, if not sacrifice, the lives of their fellow-men. The law in question has now been in operation at this port something more than four years; and, with the exception of some eleven months, the duties and responsibilities of its administration have devolved upon me. On the 21st of April, 1849, I made a report to the New York Academy of Medicine, on the practical operation of this law, and stated therein the more important articles of drugs and medicines, with the quantities annexed, rejected by me up to that date; but as that report is doubtless familiar to most of your readers, I have not deemed it necessary to repeat them here. The following are the more important articles, with the quantities annexed, that I have since rejected and condemned as not of the requisite strength and purity to be safely and properly used for medicinal purposes, viz:—Senna, 31,838 lbs.; jalap root, 37,121 lbs.; rhubarb root, 5782 lbs.; sarsaparilla, 65,374 lbs.; mezereon bark, 1353 lbs.; opium, 3164 lbs.; kino, 230 lbs.; scammony, 1483 lbs.; aloes, 12,375 lbs.; squills, 1626 lbs.; spurious Peruvian bark, 304,135 lbs.; Spanish saffron, 360 lbs.; ergot, 475 lbs.; chamomile flowers, 1896 lbs.; assafœtida, 3700 lbs.; worm seed, 230 lbs.; colchicum seed, 2246 lbs.; valerian root, 650 lbs.; guaiacum, 9300 lbs.; cream of tartar, 7673 lbs.; magnesia (carb.), 2867 lbs.; magnesia (cal.), 1560 lbs.; althea root, 1117 lbs.; liquorice root, 9430 lbs.; bistort root, 140 lbs.; gentian root, 7572 lbs.; gentian root (in powder), 430 lbs.; lavender flowers, 3042 lbs.; poppy flowers, 190 lbs.; hellebore root (white), 469 lbs.; Pareira brava root, 730 lbs.; cantharides, 1276 lbs.; creosote, 140 ozs.; bromine, 430 ozs.; sulphate of quinine, 3200 ozs.; iodine, 6864 ozs.; hydriodate of potass, 3720 ozs. Making altogether some 520,000 pounds, to say nothing of various articles in small quantities rejected from time to time, which I have not considered of sufficient importance to note down. This, together with the 90,000 pounds previously rejected, as stated in an early report previously alluded to, makes some 610,000 pounds of various articles of drugs and medicines condemned by me as unfit for medicinal purposes since the law took effect at this port. What articles, and in what quantities, were rejected during the eleven months that I was absent from the office, I am not advised, neither am I at this time able to say what has been done under the requirements of this act at the other ports of entry. I hope, however, that the special examiners can give a good account of their stewardship, and that they will not hesitate to do so, whenever the information is desirable as a means of pushing on the column of medical and Pharmaceutical reform.

It will be seen by the above statement, that by far the largest quantity of any one article rejected, is that of spurious Peruvian bark, or, as it is generally known in commerce, Carthagena and Maracaibo bark; and that, too, as a general thing, of the poorest and most worthless quality. The best of this bark affords on analysis only an exceedingly small per centage of quinine, not unfrequently but a mere trace, while, at the same time, it yields as high as two, and occasionally, with choice samples, two and a half per cent. of a *peculiar* alkaloid, which has been named *quinidine* in contradistinction to quinine, cinchonine, and aricine (the three alkaloids heretofore obtained from the different varieties of the cinchona tribe of plants), from which it differs essentially in several respects.

What *is quinidine medicinally understood?* How does *sulphate* of quinidine *compare with sulphate of quinine*? (from which it is very difficult to distinguish it by the naked eye,) medicinally, as a remedial agent in cases where the use of the latter salt is particularly indicated? These are important questions, and the subject is one very properly at the present time calling for prompt, patient, and persevering investigation by all those whose mission it is to prepare, dispense, or prescribe the most efficient means wherewith to combat disease; the more so for the reason, that I have detected in most of the sulphate of quinine lately imported from abroad, more or less of this non-officinal, and (in my opinion), as compared with quinine, non-efficient substance ycleept quinidine, a fact readily accounted for, when it is known that for the last year or two immense quantities of the bark in question, good, bad, and indifferent, have been exported from New Granada (as well as much from this port that has been rejected), and purchased by foreign manufacturing Chemists, for the purpose, as I have reason to believe, of mixing it with the *true* bark in the manufacture of the sulphate of quinine, hence the hybrid salt now too frequently presented to entry, a practice that, if not speedily abandoned, will ruin, as far as this country is concerned, the formerly well-deserved reputation of more than one of the foreign manufactures of sulphate of quinia I could name. The argument maintained by

some of them, that the article is used in their hospitals and found equal to pure quinine, will not answer on this side of the water; it smacks too much of the almighty dollar, even as I must believe (until further advised), at the expense of truth.

This comparatively inert substance, quinidine, is readily detected by using the method adopted by Zimmer, and published in the March number of the Pharmaceutical Journal (London), and, as I was happy to see, transferred to the May number of your valuable Journal. It is a test so perfect, so scientifically practical, and so simple withal, that any one possessing only a moderate share of chemical and analytical acumen, can successfully apply it, even though perchance he may not be able to boast of wearing the mantle of the departed Berzelius, or of having been a favourite pupil of Liebig.

The law went into operation at this port on the 12th day of July, 1848, and it is worthy of remark, as a cause of gratulation on the part of the early friends of the measure, that the importation of inferior and worthless qualities of many important drugs and medicines has since gradually and greatly decreased in quantity. For instance, I rejected during the first seven months of the working of the law 19,989 lbs. of rhubarb root; but I have since rejected only 5782 lbs., being but a fraction over one-third of the quantity. For the past eighteen months I have not had occasion to reject a single pound. I rejected during the first nine months 3347 lbs. of opium; but have since, during a period of more than two years and a half of my administration of the law, as will be seen by the above statement, rejected only 3164 lbs. For the past thirteen months I have rejected only 953 lbs., while I have passed during that period not less than 70,000 lbs. During the first two months of the operation of the law I rejected 1414 lbs. of gamboge, but have since met with that only which I was ready to pass without any hesitation. During the first nine months I rejected 2977 lbs. of gum myrrh, but all that has since been presented to entry at this port I have found satisfactory. Thus might I continue, but time and space will not permit. Enough I opine has been said and shown to satisfy even the most prejudiced and sceptical opponent of this wise measure, that if faithfully and judiciously administered, *and seconded with becoming zeal and honesty of purpose by the medical profession, the pharmaceutist, and dispensing apothecary*, it is calculated and destined to effect most beneficial and lasting sanitary reforms throughout the length and breadth of our vast and glorious land. In a word, the law has operated thus far remarkably well, considering the hasty manner in which it was framed and passed through Congress. It is in some respects imperfect, as must ever be the case with all new measures of legislation until their utility is tested by practical operation; but these imperfections were, some time since, brought to the attention of the Secretary of the Treasury, who, with his accustomed promptitude, soon after instructed me to report to the Department such modifications and suggestions as my experience in the administration of the law should dictate as most desirable, practicable, and judicious; and, notwithstanding this important and responsible trust has necessarily been made the subject of the few occasional leisure moments I could from time to time command, apart from other official duties, it is nearly completed, and, in a manner too, as I have reason to believe, that will render the law, when amended as proposed, satisfactory to all honourable dealers, importers, owners, and consignees, and at the same time do away with the not unreasonable objections entertained by our marine insurance companies; while its efficiency, instead of being in any manner impaired by the amendments, will be more perfectly guarded and essentially strengthened.

To conclude, I beg to say, that although I have not the honour of belonging to any Pharmaceutical Association, I nevertheless take great interest in everything calculated to advance the good cause and noble calling in which you have so long been engaged; and I hope the day is not far distant when every city and town of importance throughout this wide-extended country, will be favoured with an organization of the kind, radiating from a *National* Pharmaceutical Association as a common centre. It would be of vast benefit to the community at large, as well as eminently useful to the medical profession; for as all must admit, it is of the most vital importance to the success of the physician that his remedial agents are properly prepared by a well-bred and perfectly educated Chemist and Pharmaceutist; and I may add my conviction, that medical and pharmaceutical chemistry, a part of medical education that has thus far been most unpardonably neglected, should be universally and efficiently taught in our Schools of Medicine.—*Proceedings of the National Pharmaceutical Convention.*

PHARMACEUTICAL ETHICS.

There are in all professions certain rules of conduct, understood if not actually agreed upon, among the Members, a deviation from which is held to be unprofessional. These rules have no relation to the law of the land; they constitute a voluntary or self-imposed restraint, having for its object the elevation of the tone and character of those who are under their influence, and the maintenance of harmony and good order in the profession. Such laws, to which the term ethics is applied, have been repeatedly discussed in the Medical profession, and although no definite code or system of ethics has been universally adopted, various propositions and drafts of such a code have been considered, acted upon in certain localities, and recommended by Medical Associations.

In the course of the proceedings of the Pharmaceutical Society, questions have arisen having reference to the mode of conducting business, the relation between Principals and Assistants, the regulation of prices, the sale of patent or proprietary medicines, and other matters of a personal nature, but at the same time affecting the character of the body. The Council have been appealed to in some of these cases which were deemed not fit subjects for legislation while their importance was felt and acknowledged. It was thought that any officious interference with the private arrangements of individuals would be inconsistent with the functions of the Council, and likely to frustrate the object in view by giving offence.

That which the law of the land or the laws of an association cannot effect, may be brought about by the moral influence of a code of ethics voluntarily subscribed to, and recommended for general adoption. The Chemists having until lately been disunited, and ranked rather with the trades than the professions, have not had the advantage of that discipline which is the natural result of organization and professional intercourse, but we think the time has arrived when a code of ethics might with propriety be considered, and certain principles of action inculcated, which it should be the aim of our Members to follow. It is true, that whatever may be the standard of professional conduct agreed upon, there will always be some who will not come up to it, but the tendency will be in the right direction, and those who desire to maintain and improve the character of their profession, will have a tangible and recognized standard or court of appeal by which to regulate their conduct.

The Pharmaceutical Chemists (or Apothecaries as they are designated) in America have anticipated us in the adoption of a code of ethics, which, although not yet complete in all respects, is a step in advance, and will pave the way for further progress. The regulations were passed at the meeting of the Pharmaceutical Congress in August last, and all the Members of the American Pharmaceutical Association are required to subscribe to them, as one of the conditions of their admission into that body.

CODE OF ETHICS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The American Pharmaceutical Association, composed of Pharmaceutists and Druggists throughout the United States, feeling a strong interest in the success and advancement of their profession in its practical and scientific relations, and also impressed with the belief that no amount of knowledge and skill will protect themselves and the public from the ill effects of an undue competition, and the temptations to gain at the expense of quality, unless they are upheld by high moral obligations in the path of duty, have subscribed to the following *Code of Ethics* for the government of their professional conduct.

Art. I. As the practice of Pharmacy can only become uniform by an open and candid intercourse being kept up between Apothecaries and Druggists among themselves and each other, by the adoption of the National Pharmacopœia as a guide in the preparation of officinal medicines, by the discontinuance of secret formulæ and the practices arising from a quackish spirit, and by an encouragement of that *esprit de corps* which will prevent a resort to those disreputable practices arising out of an

injurious and wicked competition: Therefore, the members of this Association agree to uphold the use of the Pharmacopœia in their practice; to cultivate brotherly feeling among the members, and to discountenance quackery and dishonourable competition in their business.

Art. II. As labour should have its just reward, and as the skill, knowledge, and responsibility required in the practice of Pharmacy are great, the remuneration of the Pharmaceutist's services should be proportioned to these, rather than to the market value of the preparations vended. The rate of charges will necessarily vary with geographical position, municipal location, and other circumstances of a permanent character, but a resort to intentional and unnecessary reduction in the rate of charges among Apothecaries, with a view to gaining at the expense of their brethren, is strongly discountenanced by this Association as productive of evil results.

Art. III. The first duty of the Apothecary, after duly preparing himself for his profession, being to procure good drugs and preparations (for without these his skill and knowledge are of small avail), he frequently has to rely on the good faith of the Druggist for their selection. Those Druggists whose knowledge, skill, and integrity enable them to conduct their business faithfully, should be encouraged, rather than those who base their claims of patronage on the cheapness of their articles solely. When accidentally or otherwise a deteriorated, or adulterated drug or medicine is sent to the Apothecary, he should invariably return it to the Druggist, with a statement of its defects. What is too frequently considered as a mere error of trade on the part of the Druggist, becomes a *highly culpable* act when countenanced by the Apothecary; hence, when repetitions of such frauds occur, they should be exposed for the benefit of the profession. A careful but firm pursuit of this course would render well-disposed Druggists more careful, and deter the fraudulently inclined from a resort to their disreputable practices.

Art. IV. As the practice of Pharmacy is quite distinct from the practice of medicine, and has been found to flourish in proportion as its practitioners have confined their attention to its requirements, and as the conduction of the business of both professions by the same individual involves pecuniary temptations which are often not compatible with a conscientious discharge of duty, we consider that the members of this Association should discountenance all such professional amalgamation; and in conducting business at the counter, should avoid prescribing for diseases when practicable, referring applicants for medical advice to the Physician. We hold it as unprofessional and highly reprehensible for Apothecaries to allow any per centage or commission to Physicians on their prescriptions, as unjust to the public, and hurtful to the independence and self-respect of both the parties concerned. We also consider that the practice of some Physicians (in places where good Apothecaries are numerous), of obtaining medicines at low prices from the latter, and selling them to their patients, is not only unjust and unprofessional, but deserving the censure of all high-minded medical men.

Art. V. The important influence exerted on the practice of Pharmacy by the large proportion of Physicians who have resigned its duties and emoluments to the Apothecary, are reasons why he should seek their favourable opinion and cultivate their friendship, by earnest endeavours to furnish their patients with pure and well-prepared medicines. As Physicians are liable to commit errors in writing their prescriptions, involving serious consequence to health and reputation if permitted to leave the shop, the Apothecary should always, when he deems an error has been made, consult the Physician before proceeding; yet in the delay which must necessarily occur, it is his duty, when possible, to accomplish the interview without compromising the reputation of the Physician. On the other hand, when Apothecaries commit errors involving ill consequences, the Physician, knowing the constant liability to error, should feel bound to screen them from undue censure, unless the result of a culpable negligence.

Art. VI. As we owe a debt of gratitude to our predecessors for the researches and observations which have so far advanced our scientific art, we hold that every Apothecary and Druggist is bound to contribute his mite towards the same fund, by noting the new ideas and phenomena which may occur in the course of his business, and publishing them, when of sufficient consequence, for the benefit of the profession.—*Proceedings of the Pharm. Convention, Philadelphia, Oct.*, 1852.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

Wednesday, January 12, 1853.

MR. JACOB BELL IN THE CHAIR.

THE FOLLOWING DONATIONS WERE ANNOUNCED:—

Parts 1 and 2 of *Parnell's Applied Chemistry*, from Mr. Beasley, Uxbridge.
The Insurance Magazine for January, from the Institution of Actuaries.
Four Manuscript vols. of Dr. Black's Lectures, from Mr. Greaves.
The Chemistry of the Four Seasons, by T. Griffiths, from Mr. F. Coles.
Reports of the Juries on the Great Exhibition, from the Royal Commissioners.

Specimen of Australian Gold, from Mr. Poulton, of Geelong, Australia.
Specimen of Ethiopian Pepper, from Mr. Daniel Hanbury.
Specimen of False Isinglass, from Messrs. Faber and Co., Mark Lane.
A large Collection of Dried Plants, mounted on paper, named, and arranged according to the Natural System; and a collection of Minerals, including some rare specimens, from Mr. Polyblank, of Noel Street, Islington.

The following papers were read:—

ON GENTIAN ROOT AND THE PRODUCTION OF GENTIAN SPIRIT IN SOUTH BAVARIA.

BY DR. T. W. C. MARTIUS.

It is generally supposed that Gentiana lutea, Linn., and Gentiana purpurea, Linn., yield the roots sold by druggists as radix gentianæ luteæ and gentianæ rubræ. The two plants just mentioned are found chiefly on the lower Alps of Switzerland, so that the roots imported from that country are very probably in great part derived from them. On the other hand, in France, according to Guibourt (*Histoire Naturelle des Drogues*, 4th edition, vol. ii., p. 502), the root of Gentiana lutea, Linn., is alone employed, and is abundantly met with on the Vosges and on the Pyrenees. *In* Norway, however, the root of the red gentian is chiefly gathered. According to Pereira (*Materia Medica*, vol. ii., p. 1463), gentian root is imported from Havre and Marseilles into England, and it may, therefore, be presumed that in the latter country the roots of those species of gentian are used which are indigenous to France, and chiefly that of Gentiana lutea, Linn. It is remarkable that Haller (*Preface to the Pharmacop. Helvet.* p. 9) considered the root of the yellow gentian as suspicious (*verdächtig*), and that according to Brocklesby (*Philos. Trans.* No. 486, p. 240), the use of gentian root in England has been followed, in the human subject, by loss of speech, paralysis, and even with death. In the year 1815 Schrader and Staberoh (*Herlinischer Jahrbuch für di Pharmacie*, 16th Jahrgang, 1815, p. 69), reported officially that red gentian root, obtained from a commercial house in Leipzig, and which had been used for the preparation of an extract by an Apothecary in the Neu-mark district, produced, when taken internally, the symptoms of a narcotic poison. At the subsequent investigation no perceptible difference could be discovered either by autopsy or by re-agents; and it appears to me very remarkable that the similar observations made in England should have been overlooked by both of the above-mentioned Chemists. The discovery, by the analytical investigations of Chemists, of sugar as a constituent of gentian root, explained the possibility of preparing from this drug, in its fresh state, Gentian spirit (*Enzianbranntwein*), which is so highly valued on the mountains. That spirit is distilled on the Swiss Alps from the roots of Gentiana lutea, is mentioned by Linnæus (*Pflanzensystem*, translated by Houttuyn, Nürnburg, 1779, Bd. v., p. 849), and this is the oldest notice which I can find on the subject. Planché (*Trommsdorff, Journal der Pharmacie*, 1815, Bd. xxiv., H. ii., p. 242) gives explicit information about the manufacture of this spirit in France. According to his reports the manufacture of this article must have been interrupted for some time (1813?) in France, but was

afterwards resumed with such energy that this spirit has subsequently become one of the domestic necessaries. The method of preparing it is as follows:—The root cut very small is mixed with water and allowed to ferment during a fortnight; the fermented liquid is then distilled, and the distillate, which smells and tastes of gentian, is rectified over wormwood, hyssop, &c. The liquid has now lost the taste of gentian, and possesses a strength of 19½° Baumé. The taste is not disagreeable, but the gentian odour is very perceptible. Planché obtained by three times repeated cohobation of the fresh root an aqueous distillate of a poisonous, nauseous odour, a tablespoonful of which produced violent nausea and a kind of intoxication.

Mérat and De Lens (*Dictionnaire Universel de Matière Médicale*, vol. iii., p. 563) also state that alcohol can be extracted from the root of gentian by fermentation and distillation, but that besides Gentiana lutea, other species, namely, Gentiana punctata and punctato-lutea (the latter is the Gentiana lutea, Linn., var. punctato-lutea, Griesb., De C., Prodrom., vol. ix., p. 87), which grow in the south of France, are also employed in the manufacture of gentian spirit. Once only I met with this beverage on a journey in Switzerland. It had been very probably prepared from Gentiana lutea, Linn. After several hours travelling on the mountains, we arrived wet and exhausted in the neighbourhood of Alliveneu, if I am not mistaken, and were obliged to stop there for the night. As a refreshment they placed before us a bottle of gentian spirit. It was a turbid liquid of a peculiar odour, and slightly bitter taste, and not of any great alcoholic strength. I drank about a small wine-glassful of it, when, after a frugal supper, I felt a strong inclination to vomit, violent trembling and coldness. At the same time my sensorium was much affected. Cold perspiration covered my brow, my feet became cold, and my condition was in general so bad, that my travelling companion, who was afraid that I had been poisoned, became greatly alarmed about me. In the absence of other remedies, they gave me milk to drink, which caused me to vomit several times, and towards morning an abundant perspiration ensued. We were able then to proceed on our journey, but my head was during the following day affected, my limbs heavy, and my appetite entirely gone. I describe this effect on myself the more circumstantially, because I never had any other opportunity of making similar observations. From these facts I may infer that the roots of Gentiana lutea, when subjected to fermentation, develop (under certain circumstances) a narcotic poison, which is soluble in alcohol. As large quantities of gentian root are gathered on the mountains of South Bavaria, and are manufactured into gentian spirit, I availed myself of my visit to the whey establishment (*Molkenanstalt*) in Achselmannstein, to make myself somewhat more acquainted with the details. I must here premise, that on these mountains the Gentiana pannonica Scopoli and the Gent. punctata Linn. are chiefly met with, and their roots are also gathered. If, according to the observation of Schrader and Staberoh above quoted, an admixture of the roots of belladonna and aconite should be suspected, it must be borne in mind that the first of these plants does not grow at those elevations in which the species of gentian occur, whilst the roots of the various species of aconite scarcely admit of being mistaken, as they are easily recognized by their finely fibrous structure. Two roots, which have indeed often been found mixed with the root of gentian, are radix imperatoriæ and radix hellebori alb. The mother-plants of these two roots are found at the same elevation with the gentians, and if they have actually been met with among the commercial gentian root, the small proportion in which they were found admixed, shows that it was only by accident, and not for the purpose of adulteration, that they were intermixed. But Schrader (*Buchner, Repert. für Pharmacie*, Nürnberg, 1828, Bd. iii., p. 237) says that he has found among 100 lbs. of gentian root, *one pound* of white hellebore root; this is indeed a very large proportion. He also states, that he has found radix alli victorialis and radix iridis among the roots of gentian. But this admixture I have never yet met with.

Having heard that Bartholomew Mittner is established at Bischoffswies as distiller of gentian spirit (a second establishment of the same kind exists in the neighbourhood of Königssee), I went there, in order to examine on the spot the digging-up of the roots and the manufacture of the gentian-spirit. My gentian distiller was at first a little reserved and surprised to see a person who, according to all appearances, did not belong to the mountaineers, take an interest in these matters. He soon became, however, more affable, and gave me the following information:—

For the permission of collecting the roots, he pays yearly a certain sum to the

Commissioners of Woods and Forests at Berchtesgaden, who give him as much as possible their support and assistance. The digging-up of the root is performed by labourers, who raise the root from the soil with a picksaxe. This instrument is fifteen inches long, of the thickness of the little finger, pointed at one end, arched like a bow and fastened like an axe to a wooden handle. The labourer grasps with one hand a bundle of flowering stems, whilst with the other he cleverly inserts the point of the axe by a slight cut at the lower part of the root, and by more or less forcible lifting and moving to and fro he loosens the latter from the soil. By shaking it is freed from the adhering earth, the stalks cut off, and the roots carried to a certain place. As the roads to the lower valleys, from whence the crops can be transported by carts, are very difficult, and pass over steep rocky walls and mountain paths, they make use of a kind of small, square, not very deep, basket, which is carried on the back. These baskets are filled with roots, and the uppermost placed so that they project about half-a-foot beyond the brim of the basket; other roots are then piled upon these to about 100 and 150 lbs., and then tied over with rope. By this means a large heap is formed, which reaches over the head of the bearer. In this way, the point of gravity of the load falls nearly upon the spine of the stooping carrier, and thus the burden becomes much easier. It is astonishing what loads these men are in this way able to carry. From the valley, the roots are transported by carts to the distillery, where they are cut into small pieces by two men on a board of eight feet long and three feet broad. This is done with a short, strong, iron chopping knife, of which each man is furnished with two. The roots thus prepared are now placed in tubs, each holding about two-and-a-half or three pailfuls [*Eimer*], water is poured over them, and they are left to ferment in a small room which admits of being heated. I had no thermometer with me, but I should say the temperature of the place was not above 25° R. The tubs are covered with circular pieces of pine-wood fastened down by stones, and the fermentation is generally completed within about seven or eight days. The noise, which the rapidly developing bubbles of carbonic acid made, was distinctly perceptible on placing the ear to the tubs. The distillation is then performed from a small copper still, whose head is provided with two tubes. The cooling process is excellently managed. Into the kitchen where the apparatus stands a mountain brook flows, by which means a low temperature is constantly obtained. On the walls of the refrigerator, which is proportionately not very large, I fancied I observed a conferva in great abundance, and I am sorry that I did not take some of it away with me. The distillation is performed by means of a wood fire, and the residue in the still possesses, as may easily be imagined, a very bitter taste, and is thrown away as refuse. The spirit thus obtained is purified by a second distillation, and at the close of this article I shall give a brief notice of the two products, *crude* and *rectified* gentian spirit, which I took home with me. To what extent this business is carried on, may be seen from the fact that Mittner sold last year eighty-one cwt. of dried gentian root, and that his spirit is far and wide inquired for as an excellent product.

I shall now add the results of some experiments made with the two kinds of spirit.

Crude Gentian Spirit.—This liquid is of a slightly yellow colour, and possesses an unpleasant smell, and a peculiar and by no means agreeable taste. At 12° R. it indicated 44° Tralles. Litmus was strongly reddened by it; hydrosulphuret of ammonia produced in twenty-four hours an abundant white precipitate; acetate of lead dirty yellow flakes; nitrate of silver became strongly reduced, the supernatant liquid was slightly reddened; muriate of gold became completely reduced, with the deposition of a black sediment.

The Rectified Gentian Spirit was clear like water, did not possess a strong smell, but still a rather disagreeable one; at 12° R. it showed 39° Tralles, and was consequently weaker than the crude product. The taste was, however, not so unpleasant; litmus was slightly reddened by it. Hydrosulphuret of ammonia, as well as acetate of lead, produced no reaction; nitrate of silver became reduced, but not so much so as by the crude spirit. Muriate of gold also suffered a slight reduction; the reaction was, however, comparatively weak.

It appears, therefore, that besides an acid (acetic acid?) some volatile oil, analogous to fusel oil, is contained in this spirit; but the small quantity which I possessed admitted of no further experiments. Narcotic effects are said never to have been produced by it, and it appears, therefore, that there is a difference between the gentian spirit of Switzerland and that manufactured in Bavaria.

ON A NEW TEST FOR DISTINGUISHING THE RUSSIAN, INDIAN, AND ENGLISH RHUBARBS.

BY MR. JOHN S. COBB.

The absence of a good test for distinguishing the Russian from East Indian rhubarb has been too much felt and too often expatiated on to require any comment. The want of it has led to a great many analyses, undertaken with a view to the discovery of some constituent peculiar to one or the other species; I am not, however, aware of any successful results having, up to the present time, ensued from these researches, at least so far as concerns the discovery of any reagent capable of distinguishing the varieties of this drug. Several tests have indeed been proposed, but none of these are to be relied upon. The gritiness, when chewed, caused by the presence of oxalate of lime in the Russian variety, is far from being a satisfactory test. I have met with specimens of Indian rhubarb possessing this quality to a great degree.

Geiger states that "iodized hydriodic acid" gives with a decoction of Russian rhubarb a green tint, with Indian a brownish colour, and a deep red with the English rhubarb; but in my hands this test has proved singularly fallacious; with it I obtained a green colour with the Russian, a dirty green with Indian, and a sea-green with English rhubarb. Moreover, the colour varies according to the quantity of the test added; and if the latter be in excess, any of the varieties when viewed by transmitted light, will seem of a red colour. If, however, the solution be subsequently plentifully diluted with water, the green tint is rendered evident.

Thomson remarks, first, that a solution of isinglass gives a more abundant precipitate in the Indian than in the Russian rhubarb; and second, that the decoction of yellow bark gives a more abundant *greenish* precipitate with the infusion of Russian than with the East Indian rhubarb, in the latter of which the precipitate is bright yellow.

These tests do not appear to me to be conclusive. The precipitate caused by the solution of isinglass, gives a bulkier but not really more abundant precipitate in the one case than in the other, as is evident when the precipitate has subsided, and the difference of colour in the other test is so small that it requires a somewhat artistic eye to appreciate the distinction, and it certainly would not serve otherwise than as a comparative test. I may incidentally mention here, that in the course of my experiment, I found that the acetate of lead, when ammonia had previously been added, gave with infusion of Indian rhubarb a violet-red precipitate, and one approaching to a brick-red with Russian rhubarb, the precipitate in the latter being of a coarser description than in the former. The same objection, however, applies to this as to the previously cited tests, for any reagent depending for its efficiency on a slight variation in colour or bulk, must practically be of little value. Bearing this in mind, I have endeavoured to find one not liable to these objections.

The test to which I am about to direct your attention is based on the supposition which I had the honour of suggesting to you some two years since, that the precipitate formed in the tincture of rhubarb is the result of the oxidation of the active principle of the rhubarb. I am not at present prepared to maintain the correctness or inaccuracy of this view, but I am now engaged in some experiments on the subject, which, if satisfactory, I shall have the pleasure of submitting to you on a future day. Starting then with this hypothesis, and remarking that the tincture, when made with Indian, deposited more than with the Russian rhubarb, I thought it probable that an oxidizing agent might exhibit sufficient difference in its *modus agendi* on the species of rhubarb to enable us to identify them thereby. In this though at first unsuccessful, my anticipations were ultimately realized. If two drachms of simple (*proof*) tincture, of the P. L. strength, be placed in a test tube, and treated with one drachm of a mixture of equal parts of nitric acid and distilled water, the following results will take place:—

East Indian soon becomes cloudy, and in from five to twenty minutes is turbid.

Russian remains unchanged for three or four hours,

English loses its brightness in half an hour; on holding it before a light a precipitate may be seen diffused through it.

If, instead of ʒij. of tincture, one of tincture and one of water be used, the test, as regards the Indian, is still more prompt, but the difference between the English and Turkey not so clearly defined.

There are one or two precautions to be observed in the application of this test: the dilute acid should be gradually added, the test tube being shaken in the meantime. Again, if rectified tincture or strong acid be used, very equivocal results are obtained. My first experiments were made with strong acid and rectified tincture. The results were excellent, as far as regarded three or four samples; but when I came to essay another, the very reverse of the former experiments took place. I thought at first that the samples of rhubarb could not be rightly marked, but on again returning to the former samples, they also gave contradictory results. I procured other samples, but ultimately discovered that this anomalous reaction was due to the time the nitric acid was left in contact with the supertangent film of tincture, in which it seemed to set up a sort of fermentation, which, after the two were mixed by agitation, propagated itself throughout the liquid. Thus, if two drachms of tincture of East Indian rhubarb be placed in two separate test tubes, held in the hand, and the acid added; if the tube to which the acid is last added be immediately agitated, and then the other treated in a similar manner, the one will shortly let fall a ropy deposit, while the other remains clear. By using the dilute acid and proof tincture these fallacies are avoided.

Yarmouth, January 10th, 1853.

ON THE ESTIMATION OF THE STRENGTH OF FRENCH ESSENCES.

BY MR. THOMAS JACKSON.

Wishing to estimate the comparative value of two samples of "*Extrait triple au Jasmin*" in a more positive and satisfactory manner than that founded on their specific gravities, or their odours, and having searched in vain through the works at my command for some acknowledged mode of operating, I took into consideration the possibility of isolating the essential principles present, unmodified by heat or by combination.

A preliminary experiment, performed with one drachm of essence added to two ounces of a strong solution of chloride of sodium slightly acidulated, exhibited on the surface of the liquid a film of essential oil, reddened by the free acid, after a night's repose. With the view of obtaining a similar but more complete result, I substituted chloride of calcium for common salt. Commercial chloride of calcium was dissolved in rectified spirit, and the solution filtered and evaporated to dryness. To half-an-ounce of essence, contained in a graduated tube, the dry chloride of calcium was added to saturation, then two drachms of water, or as much as was required to render the mixture sufficiently fluid for the essential oil to separate. The solution, previously to the addition of the water, was clear, but when the water was added it became cloudy, and evidence of the separation of oil was soon manifested.

Under these circumstances the oil rises to the surface, and is found there in a flocculent mass after the mixture has stood for a few hours, or during a night; and the measure of the oils thus separated afford a fair index of the relative strength of the essences examined.

In order to get the oils in a more definite state, the mixture in which the separation had been effected was twice washed with an equal volume of ether,

and the latter, after being decanted, was allowed to evaporate spontaneously. The sides of the evaporating dish were coated with a concrete oil of a light orange colour, and at the bottom of the dish was a small quantity of fluid, which, on being dried over sulphuric acid, afforded crystals of chloride of calcium. By washing the contents of the dish with ether, which had been previously dried with chloride of calcium, and again evaporating the solution spontaneously, the essential oil was obtained free. It is a concrete oil, having a powerful and characteristic odour, and of a pale colour. On the addition of oil of vitirol, it acquires a deep blood red colour and a pungent odour.

The mother liquor, containing the chloride of calcium, from which the oil had been separated, on being afterwards evaporated afforded a very faint smell.

Two samples of essence examined in the manner described, gave, in round numbers, one grain and three grains respectively of essential oil from half-an-ounce of the essence.

Manchester, 11*th January*, 1853.

ON THE PREPARATION OF EXTRACT OF COLOCYNTH.

Mr. Curtis, of Crawford Street, laid before the meeting several samples of simple extract of colocynth, accompanied by some remarks on their preparation. He had made these samples experimentally, in consequence of what had been stated on the subject at previous meetings.

Sample No. 1.—*Extract of Colocynth*, made strictly according to the Pharmacopœia of 1851.

3lbs. troy of the finest colocynth pulp were macerated in half-a-gallon of distilled water for thirty-six hours, and pressed strongly. The liquor, which was pretty bright, was strained, and evaporated very carefully at a temperature not exceeding 150° F., to a pilular consistence.

During the evaporation, the product separated into two parts; the one a very tenaceous substance of the consistence of an extract, and the other a thick brown liquor of the consistence of treacle. In completing the evaporation, it was found advantageous to remove the former while the latter was being brought to the proper consistence, and then to mix the two products in a mortar.

The extract amounted to twelve per cent. of the weight of the colocynth.

Sample No. 2.—*Extract of Colocynth*, made from the residue of No. 1.

The marc left after the preparation of the first extract was macerated again with the same quantity of water and for the same time as before. The pressed liquor was not so bright as that of the previous experiment, but it appeared to be equally bitter. In effecting the evaporation of this liquor, much less separation took place than in the previous experiment, and the product appeared to consist principally of the part which has been described as a thick brown liquor. There was but a small portion of the tenaceous substance.

The product amounted to nine per cent. of the original weight of the colocynth.

Sample No. 3.—*Extract of Colocynth*, made from the residue of No. 2.

The marc left after the preparation of the second extract, was treated precisely as before. The pressed liquor was exceedingly muddy and opaque, and on being heated and allowed to cool, it resembled a thick jelly. As it evidently contained much inert matter, it was returned to the marc, and two pints of rectified spirit and one pint of water being added, these were allowed to macerate for two days. The pressed liquor was now found to be perfectly bright, and somewhat resembled in appearance the liquor obtained in the first maceration of the pulp for the preparation of sample No. 1.

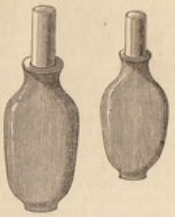
The product amounted to eight per cent. of the original weight of the colocynth.

Mr. Curtis stated that he had been principally induced to prepare these extracts in the manner described, with the view of having their relative strengths tested by some physician.

CHINESE PHARMACY.

Mr. Daniel Hanbury presented to the Society two specimens of Chinese proprietary medicines, one in the form of pills, and the other of powder. Each medicine is enclosed in a little earthenware bottle, of the form and size figured below, and wrapped up with a bill, of which we give a translation:—

"*Frogs Juice Pills*, a panacea for all ills.



Size of the Pill.

"To stop immediately flatulence, pain in the stomach, heat and burning in the heart and mouth, nervous depression, vomiting and purging,—take ten of the pills, and swallow them with hot water.

"Mr. Yaou, of the Key-Kwan shop, to the eastward of the Magistracy at Shanghae, respectfully presents (the medicine)."

"*The Sleeping Dragon Powder.*—For children afflicted with pain in the bowels, general fever, flatulence, pain in the head with fever, vomiting and purging; also for convulsions or fits when the child writhes about and distorts itself in great degree to the peril of its life, rolling the eyes and twisting the neck—take a little of the powder and blow it up the nose, and when the child sneezes it will speedily recover.

"Mr. Yaou, of the Key-Kwan shop, to the eastward of the Magistracy at Shanghae, respectfully presents (the medicine)."

PROVINCIAL TRANSACTIONS.

PHARMACEUTICAL MEETING, EDINBURGH,

Tuesday, 18*th January*.

MR. J. F. MACFARLAN IN THE CHAIR.

The following papers were read:—

ON A NEW SOURCE OF KINO.

BY ROBERT CHRISTISON, M.D., V.P.R.S.E.,
Professor of Materia Medica in the University of Edinburgh.

In a letter of the 20th of last July, from a merchant of Moulmein, Mr. R. S. Begbie, son of Dr. Begbie of this city, I was informed that a species of kino—which seemed to him to present the physical and chemical properties of the commercial variety of that drug in the English home market, and which had been ascertained by a medical friend at Moulmein to possess also its medicinal virtues—might be largely obtained from a tree abounding in the adjacent provinces. Mr. Begbie added, that he believed "a small quantity had been sent some years ago to England; but as an article of export generally it has not yet been shipped." This notice was accompanied by a small specimen, which is now produced, and which is large enough to allow of its principal properties being accurately ascertained.

As the inquiries I have made lead me to suppose that the article in question is of a very fine kind, and that the fact of its production near Moulmein, and pro-

bably over a considerable part of the neighbouring province of Pegue, is not hitherto known in Europe, I beg to present to the Pharmaceutical Society the following description of it, and the reasons which induce me to think that it is obtained from the identical tree which yields in Malabar the present commercial kino of European trade.

The small portion sent by Mr. Begbie consists partly of little angular fragments; but there are several larger masses which are portions of cylinders, about half-an-inch in diameter, apparently moulded by collecting the juice in reeds. These have externally a greyish, striated surface, most unlike that of the broken fragments of commercial kino. They are easily frangible; and the broken pieces have exactly the appearance of ordinary kino, except that they are even blacker, and more glassy by reflected light; and by transmitted light, though opaque when of very moderate thickness, they are of a splendid cherry-red colour in very thin fragments. They are easily reduced to fine powder, which has a dark, dirty, lake tint. Their taste is very slightly, bitter and intensely astringent.

Cold water acts more quickly on this kino than on the kino of commerce, gradually dissolving a very large proportion of it, and forming a deep cherry-red, astringent solution; and there is left a small proportion of greyish flocculent matter, which is slowly soluble in a great measure in boiling water, and which appears to be analogous to the insoluble variety of gum called bassorin. Boiling water dissolves this kino almost entirely, and the solution, when cold, continues nearly transparent for at least an hour; but afterwards it becomes slightly turbid, and a scanty, flocculent precipitate slowly subsides. Both the hot and cold solutions yield, when much diluted, a deep olive-green precipitate with the tincture of sesquichloride of iron; and when the solution is concentrated, a dirty grey precipitate is formed so abundantly that the whole fluid becomes a thick pulpy mass. A boiling solution in twenty-five parts of water forms with the iron test a pulp too thick to flow, which is one of the characters assigned in the Edinburgh Pharmacopœia to true officinal kino. But I find further that a solution in even seventy-five parts of cold water has a beautiful intense cherry-red colour, and forms with sesquichloride of iron, in the course of an hour, a pulp so thick as to flow only sluggishly.

On comparing these characters with a fine specimen of kino of home trade, and also with a specimen collected in the neighbourhood of Goomsoor, in Mysore, by Dr. Cleghorn, of the Madras Medical Service, when he was Surgeon of the surveying corps in that country, I find that the last two are identical, with the single exception that Dr. Cleghorn's specimen is somewhat redder when seen in bulk; and that the Moulmein kino is blacker, more vitreous in lustre, rather more easily soluble in cold water, and with rather less flaky residue; and when the cold solution is diluted to the strength of one in seventy-five, it requires rather more sesquichloride of iron to throw down all its tannin, and consequently the precipitate forms with the water a somewhat firmer pulp.

This kino dissolves, with only a trace of flaky residue, in rectified spirit, which forms an intense cherry-red tincture of very pure astringent taste. The quantity in my possession is scarcely sufficient to allow of a fuller examination of its chemical properties and composition. But its physical characters, the action of water, and the properties of the watery solution, even as I have shortly indicated them, are enough to prove that the Moulmein kino is identical in nature with the present kino of home trade, and in point of quality somewhat superior. I have no doubt, from its taste, and the action of the iron test, that an analysis will prove the presence of a larger proportion of tannin.

It does not absolutely follow, even from the exact correspondences now mentioned, that the Moulmein kino is derived from the same botanical source with the present officinal kino of Europe. The officinal sort has been accurately referred by the separate researches of Dr. Gibson, Dr. Pereira, and Dr. Royle, to the *Pterocarpus Marsupium* of Roxburgh, a fine forest tree abounding in the hills of Mysore and other parts of the Indian Peninsula. But the *Butea frondosa* also yields a fine kino, which I have shown in my Dispensatory to be scarcely distinguishable in chemical properties from the officinal kind.

Mr. Begbie, however, has fortunately supplied me with a description of the Moulmein tree, sufficient to identify it with the true kino tree of Mysore. "It is," says he, "one of the commonest trees in the adjoining provinces, and is called by the Burmese *Padouk*. It grows to a great size and height. Immediately before the rainy season it is covered with long pendant yellow flowers, of an exceedingly sweet odour, like that of jessamine. The tree flowers three times, at intervals of perhaps a week or ten days; each blow lasting about twenty-four hours. The wood is in colour like mahogany, and exceedingly heavy. It is used in India for making gun-carriages; and at present we are preparing some for the London market, in execution of an order, I fancy, for the Royal Artillery. It makes most beautiful furniture. The gum exudes slightly without incision; but on a cut being made into the tree, it bleeds most freely." This description is not sufficiently botanical to enable me to determine the tree from its characters in botanical works. But on submitting Mr. Begbie's letter to Dr. Gibson, Conservator of the Forests of Bombay, who very lately visited Edinburgh, that gentleman at once recognized his old acquaintance of the Indian woods, the *Pterocarpus Marsupium;* which he was one of the first to discover to be the true source of kino, by observing that, when his companions on a shooting party cut their names into the bark of a tree beside which they had been resting, a red juice freely exuded, and concreted into a dark astringent gum, like the kino of commerce.

NOTICE OF SOME OF THE APPROVED PROCESSES FOR THE DETECTION OF POISONS.

BY DOUGLAS MACLAGAN, M.D., F.R.S.E.,
Honorary Member of the Pharmaceutical Society.

Dr. Maclagan, before entering on the subject announced, felt called upon to offer some apology, both for the nature of his communication and for the form in which he laid it before the Society. He regretted that he had not in his power at present to offer to the Meeting anything new of a Pharmacological nature, and he felt that the detection of poisons not being part of the ordinary avocations of a Pharmaceutical Chemist, the subject wanted direct practical importance to recommend it to their attention. Toxicology was one of the subjects which, in deference to the expressed opinion of certain parties, had been excluded from that portion of the Pharmacy Bill which regulated the education and examination of Pharmaceutical Chemists. He did not see upon what grounds this objection had been made, nor what the objectors gained by obtaining the exclusion of the offending word. It had been said, that making Chemists study toxicology tended to make medical practitioners of them; and he supposed that the fear was, that they would thus take something from the practice of other people. If poisonings were as common occurrences, as births there might be some ground for the fears thus entertained, but being fortunately comparatively rare occurrences, the fear entertained upon this point appeared to him to be groundless. Toxicology might nominally be excluded from the education of the Pharmaceutical Chemist, but practically it could not. He would encounter the description of the properties of poisons, and learn something as to the modes of detecting them, in the systematic courses of lectures on chemistry, and he could not help acquiring some acquaintance with their effects on the human frame in the lectures on Materia Medica. It had occurred to him, that as the Pharmaceutical Chemists were thus so far made acquainted with toxicology, they would perhaps like to learn something of those details of the subject, which could not be entered upon in the chemistry or Materia Medica class rooms; and, therefore, when the Secretary of the Pharmaceutical Society had requested him to take part in the proceedings of the present Meeting, he thought that it might not be uninteresting to them to get from him some account of the more approved processes for the chemical detection of poisons.

In briefly contrasting the present state of our knowledge of the chemical characteristics of many poisons with the gross ignorance of the subject which prevailed at no very distant period, he felt that he would be doing an act of injustice if he did not, even in Dr. Christison's presence, point out to the Meeting how much of the improvement of our knowledge of poisons was due to the impetus given in this country to the study of toxicology by the publication of his valuable work on poisons. The majority of the Members present knowing the bulk of that volume, would be afraid of a serious infliction on their patience if he proposed to go over any great extent of the subject, and therefore he would, for the present, limit himself to a few observations on one of the most common poisons—arsenic.

Perhaps none afforded a better illustration than this of the recent improvement in our resources for detecting poison. In the well known case of Miss Blandy, who was convicted of the murder of her father, by arsenic, in 1752, the verdict was certainly a just one, but it was a fact respecting the chemical evidence then given, that few if any of the tests and reactions, propounded by the medical witness as evidence of the presence of arsenic, could have had anything to do with arsenic at all. It might now be affirmed, that there was no substance which could be detected with so much certainty and precision, and by such indisputable proofs, as that very poison. One of the greatest improvements in the method of detecting arsenic was due to Dr. Christison, who simplified and amended the process for separating it from organic mixtures in the form of sulphuret. This was a great improvement at the time, but it was no disparagement to the value of Dr. Christison's researches to say, that that had now been superseded in medico legal practice by other processes of a still more improved character. To two of these, known as Reinsch's and Marsh's methods, he would shortly direct their attention.

It was well known that there are three tests for arsenious acid in a state of solution :—Ammonio nitrate of silver, which throws down the yellow arsenite of silver; ammonio sulphate of copper, which gives the arsenite of copper, known as Scheele's green ; and sulphuretted hydrogen, which precipitates the arsenic as the yellow sulphuret, orpiment. These tests, taken singly, were each open to objection; but taken together, when they presented their characteristic reactions, they afford indisputable proof of the presence of arsenic. Now the aim of all the recent improvements in the processes for arsenic was directed towards separating it from other matters, so as to get it in the state of a pure solution in water, to which these liquid tests could be applied. Reinsch's and Marsh's processes had been called tests for arsenic, but they were not properly so called; they were merely improved methods of separating the poison from complex mixtures, so as to enable it to be accurately recognized by its chemical and physical properties.

Dr. Maclagan first described Reinsch's method, which was distinguished by its great facility of execution, and simplicity. It consisted in boiling the suspected matters, strongly acidulated with hydrochloric acid, in contact with a piece of polished copper. The form of the copper was of no importance. Some experimenters use copper gauze, and others slips of thin sheet copper. He generally preferred a piece of copper wire rolled into a spiral form, which presented a sufficiently large surface in a small bulk, and which from its form, was easily picked out of any thick fluid, and easily washed free from organic matter. The wire should not be immersed in the fluid until it was in full ebullition, else the copper was apt to become coated with organic matter. When the copper was immersed in the boiling liquid its surface became coated with a deposit of metallic arsenic. When there was a considerable amount of poison, this deposit began to take place immediately, but when there was little arsenic present the boiling required to be continued for some time. About eight or ten minutes sufficed, in most cases, for the formation of an abundant metallic crust; there was no great harm prolonging the boiling, but it was not a general requisite. The copper was now to be withdrawn from the fluid washed free of adhering animal matter with distilled water, and dried on the water bath. It was now put into a small glass tube and gently heated. The more moderate and gradual the heat the better was the result obtained, and the result of the process when well conducted, was the deposit in the upper part of the tube of the arsenic now oxidized and re-converted into arsenious acid. It could easily with a lens be recognized as presenting the crystalline form assumed under these circumstances by arsenious acid. To any one accustomed to work with arsenic, the appearance of the sublimate was of itself quite sufficient to prove its nature, but to satisfy a jury a

was proper that this should be confirmed by the liquid tests. All that now required was to be done was to cut off the end of the small tube, withdraw the wire, and boil the portion of tube containing the sublimate in a test-tube with a little distilled water. The solution thus obtained would give all the reactions characteristic of arsenic. The process was sufficiently delicate, as appeared from the statements of Dr. Taylor, which Dr. Maclagan quoted from his work on Poisons. Dr. Maclagan had satisfied himself that a hundredth of a grain of arsenic in two ounces of thick soup could, by this proceeding, be readily and unequivocally detected.

The facility and rapidity of Reinsch's process were exhibited to the Meeting in a few minutes, by an experiment made with thick soup containing a small quantity of Fowler's solution.

Dr. Maclagan next described and exhibited Marsh's process, which consisted in evolving hydrogen gas from the liquid containing the poison. The arsenic was evolved along with it as arsenietted hydrogen gas, and from this the arsenic could readily be separated. Many forms of apparatus had been devised, but he preferred as most convenient the common Döbereiner's lamp as recommended by Dr. Christison. Various methods of decomposing the gas so as to separate the arsenic were noticed. The simplest and most certain was making the gas pass slowly along a narrow tube of German glass heated to low redness. By this means the arsenic was deposited in the interior of the tube a little beyond the heated point, in the form of a dark crust of metallic arsenic. But this was not enough to prove that arsenic was present. It might be antimony, which would under these circumstances give a metallic deposit of a nearly similar character. To distinguish these two metals many elaborate methods had been employed by Devergie and others, which consisted in exposing the crust thus obtained to the successive action of various reagents, such as chlorine, sulphuretted hydrogen, ammonia, &c. ; but these proceedings were troublesome, and not always quite unequivocal in their action. Dr. Maclagan had obtained much more satisfactory results from a simple proceeding which he had recommended, and which he had had many opportunities of putting in practice in medico-legal investigations, where minute quantities of arsenic were present. This consisted in simply observing the temperature at which the metallic deposit in the tube sublimed, and this was easily accomplished by sealing up the small end of the tube, and immersing it, up to the point where the metallic deposit was, in an oil bath. A thermometer might be put into the oil to note the temperature accurately ; but this was not requisite for distinguishing arsenic from antimony. The latter metal did not oxidize or form any sublimate except at a temperature above the boiling point of oil ; but arsenic on the contrary was in an open tube readily oxidized and volatilized, and it would at once be recognized by its becoming deposited in the upper part of the narrow tube in the form of octahedral crystals, which were generally few, large, and well defined. No other substance but arsenic did so.

Dr. Maclagan exhibited Marsh's apparatus in action, and illustrated the remarks, of which the above is a short abstract, by reference to various recent medico-legal cases.

Dr. Maclagan concluded with a very few remarks on Lord Carlisle's Act for the Prevention of the Sale of Arsenic. It was an undoubted fact that the plan of selling it mixed with indigo or soot was quite ineffectual, for both suicide and murder had been committed in Scotland with arsenic so coloured. The required quantity of soot was only 6 per cent., and if thirty grains of arsenic, quite enough to kill, were given for a murderous purpose, the two or three grains of soot which it would thus contain would never attract attention. It appeared to him that the most effectual plan was to make it the law that every person without exception who wished to purchase arsenic should apply to an official person for a written permission to make such purchase, and to make it penal in any one to sell arsenic to a party unprovided with such a document. The Procurator Fiscal of the district in Scotland, and the nearest magistrate in England, would be the proper parties to whom to apply. This need entail no expense, and no inconvenience on the purchaser of arsenic. It was not required for any of its legitimate uses in an immediate hurry. If the magistrate knew the party, or were otherwise assured of his trustworthiness, the licence to purchase arsenic might be granted at once. If the party were unknown to him, all he had to say was, that he would send a constable to make inquiries, and if the report were satisfactory the permission would be given. Many a suicide might by these proceedings be arrested in his guilty purpose of self-destruction, and no murderer would take these steps which would bring him so directly in contact with the officers of justice.

A BRIEF ACCOUNT OF THE QUALIFICATIONS OF THOSE WHO PRACTISE PHARMACY IN RUSSIA, AUSTRIA, AND PRUSSIA.

BY MR. H. C. BAILDON.

It may not be without interest briefly to lay before the Society some particulars of the qualifications required in Russia, Austria, and Prussia, from persons who are permitted by the government of these countries to practise Pharmacy. The deficient education of a considerable proportion of those who are the dispensers of medicine in Great Britain is acknowledged by all, and I believe it is now as generally admitted that the Pharmaceutical Society has already had a very beneficial effect in making the contrast between this and other countries less unfavourable than it has hitherto been. Until its influence became felt, youths were received as apprentices who had little or no knowledge of Latin, and whose general education was defective. During their apprenticeship they were seldom afforded either leisure for study or opportunity to attend, where this was possible, the necessary classes to enable them to obtain a competent knowledge of Materia Medica, Chemistry, and Botany. It is now, however, evident that in a few years, any young man who does not qualify himself properly for passing the examinations of the Society, and who should commence business without being one of its Members, will labour under serious disadvantages which would justly militate against his success; and although at present there is nothing to prevent him, however ignorant, from opening a shop and calling himself a Chemist and Druggist, yet it is more than probable that the legislature will, at no distant period, protect the public from the effects arising from the ignorance of uneducated and unqualified persons, by rendering it in this (as in most other European countries) compulsory to obtain the diploma of the Pharmaceutical Society before being allowed to commence business. The following particulars respecting the Pharmaceutical laws in Russia, Austria, and Prussia, have been communicated to me by Mr. Kerr, a gentleman whom I knew some twelve years since, when he resided in Edinburgh. He was educated in Russia, and brought up as a Pharmaceutist in that country. The strict examinations in the various sciences connected with their profession which the candidates have to pass, have hitherto placed them much higher in grade than the Chemists and Druggists of Great Britain.

"In the first place, twelve members of the Medical Faculty constitute the Board of Health in every capital of these countries. All the Apothecaries' shops or the so-named Chemists' and Druggists' are under the direct control of this Board; none are opened without its sanction, nor grants given but to those who have diplomas issued by the Medical Colleges. On applying for a licence to open a shop, it is requisite to state in what locality you purpose opening, and show sufficient proof of an existing want for such a shop in that neighbourhood.

"Secondly. The examination undergone by candidates, includes Chemistry, Botany, Zoology, Mineralogy, Materia Medica, Pharmacognosy, Latin, and the preparing of three different articles from crude organic and inorganic substances into medicinal preparations, in the pure chemical state, in the Laboratory adjoining to the College.

"Thirdly. The Board of Health, at their option, visit the shops at periods previously unknown to the proprietors, inspect all the drugs and chemical preparations, and look to the state of the establishment. If found to be conducted not in accordance with the rules of such shops, the proprietor is cautioned thereof, and if the offence be found repeated the establishment is handed over to the next applicant at a valuation, or on terms such as the buyer and seller agree to.

"Fourthly. All such establishments have licensed assistants—one or more according to the extent of the business. Apprentices are admitted into these shops on producing testimonials from some high classical school of their possessing a sufficient knowledge of Latin, and they must not be under fifteen years of age; four years are required to complete an apprenticeship. The fourth year of the pupil's apprenticeship is totally devoted to the laboratory, under the guidance of a licensed assistant, in the preparing most of the drugs and chemicals from the crude organic and inorganic bodies, into suitable chemicals and remedies used in Pharmacy. Every evening during this last year the proprietor is bound to send his pupil gratis to the lectures of the Pharmaceutical Society, where the aforesaid sciences are taught. These lectures are conducted by Professors, Members, and proprietors of shops. The pupil, on leaving the lectures, is furnished with a certificate stating what lectures he has attended. An examination takes place once monthly, when all the members are requested to be present. The pupil having now closed his attendance at the lectures, has to pass a final examination at any of the Medical Colleges, and on passing he is furnished with a diploma.

"The Pharmaceutical Society of Russia is formed of the proprietors of Apothecaries' shops, various Professors, and scientific persons. It possesses a library, chemical apparatus, a collection of minerals, a very extensive herbarium, and a cabinet of genuine drugs and chemicals, a printing-office and resident superintendent. A president, vice-president, and other officers preside in managing this Society. Meetings are held once monthly to discuss the progress and the state of Pharmacy. In a word, this Society forms the germ of the Pharmaceutists of these countries.

"*Edinburgh*, 1852."

I may here mention that the government of Russia avails itself of those who are licensed to practise Pharmacy to prevent unqualified persons from practising as medical men. Each prescription is retained by the dispenser. He has a book into which he is compelled to copy it, with the name of the person who wrote it, the hour received, and the time when the medicine was sent out. When his shop is visited by the Members of the Board of Health, this book is carefully inspected, and if any name is found which is not in the list of authorized Practitioners, the Druggist is instructed to notice every proscription with the same signature; and if any active medicinal substance is prescribed, to refuse to dispense it, but to retain the prescription to be forwarded to the Board, when steps are then taken against the offending party.

It is evident that some of the regulations which are enforced in Russia would be felt as arbitrary in this country. But a fair beginning has now been made at self-reformation; and it is the duty as well as the interest of every Member of the Pharmaceutical Society to endeavour by every means in his power to forward the work so successfully commenced. We must begin with our apprentices and see that we receive none but those who are properly educated; and it is our duty to afford them opportunities to attend the necessary classes, and proper time in the evenings for study. If we do this, a few years will accomplish what is required. We have had ample evidence of what can be done by the resolute determination of one individual, and we, as well as the public, owe a debt of gratitude to Mr. Jacob Bell for his unwearied efforts in behalf of this Society.

ON THE STATE OF PHARMACY IN GERMANY.

BY MR. THEODORE ROEDING,
Pharmacien (formerly of Hamburgh).

The greatest part of what I intended to communicate to you has been stated already by Mr. Baildon, inasmuch as the organization of Pharmacy in Russia resembles that of Germany, in fact, has emanated from it. I shall, therefore, confine myself to a few details in reference to the duties of the Board of Health, and to the relation in which the Apothecaries stand one to another in Germany.

It is first the duty of the Board of Health to prepare from time to time a new edition of the Pharmacopœia or Supplement to it, if required. In my native place, Hamburgh, are for this purpose, the different methods of preparing the chemical, as well as the Pharmaceutical medicaments, tested by all the Apothecaries, their joint experience discussed, and consequently the most approved method accepted as lawful directions for the preparations. I may therefore assert, that our Pharmacopœia answers scientifically as well as practically, and appears a sure guide in making the medicaments and testing them for their purity. (Mr. Roeding read some extracts from the Hamburgh Pharmacopœia in illustration.)

It is, secondly, the duty of the Board of Health to prepare every year a Price Current of all the articles used for medicines. The Apothecary has to charge accordingly, neither higher nor lower, or he becomes liable to a fine.

Thirdly, the Board of Health examines at least every year the premises of the Apothecary, whether he keeps any goods which are not fit for use. At these examinations, herbs, flowers, and roots out of season, chemical or pharmaceutical pre-

parations not standing the tests, are destroyed at once, and if such faults are found repeatedly, the licence is taken from the Apothecary.

The Board of Health examines, fourthly, the apprentices in Latin, mathematics, German, &c. The apprentice has to serve four succeeding years, during which time the Apothecary is bound to attend to his Pharmaceutical education, practical as well as scientific. Having served his apprenticeship, he presents himself for examination to the Board of Health; which, fifthly, has to examine the assistant. If an apprentice does not pass the examination, he is rejected altogether, and then not allowed to serve as assistant, or he is sent back to the Apothecary for such a time as the Board of Health thinks proper, but if he passes, he gets a diploma or testimonial from the Board of Health, which entitles him to enter on any engagement as assistant.

Sixthly, the Board of Health has to examine the Apothecaries who intend to establish themselves. The Apothecary wishing to pass this examination has to prove by his testimonials that he has served four years as apprentice, and from three to four years as Assistant to a licensed Apothecary, and attended the required lectures at a University for a year. If he passes the examination, he has the right to buy a shop, or to petition for the permission of opening a new one, but which petition is only then granted, when, either through increase of population, or (in the country) the distance from other shops, a new shop has become a general desideratum. The examination comprises chemistry, practical and analytical, and the latter quantitative and qualitative; materia medica, toxicology, botany, mineralogy, practical pharmacy, &c.

The government compels, by this repeated examination, the Apothecary to keep pace with the different sciences that are called into aid by Pharmacy; and here I beg leave to say a few words in reference to a remark made by your Chairman just now. It appears from this remark, that gentlemen of the medical profession have objected to a scientific education of the Chemist, under the strange supposition that such educated Chemists would begin to practise medicine, and consequently injure their interest. Now, I might ask these gentlemen whether they never have suspected the injury which their interest may suffer from uneducated Chemists? Does not their success in curing depend to a great extent upon a proper preparation of the curative agents? And how can they expect that a Chemist who has no idea either of chemical action nor of the action of the curative agents on the human body, shall pay as much proper attention to the preparing of medicines as one that has? How will they decide whether pills which contain oxymuriate of mercury are prepared properly, and if not so, how can they expect a proper effect from them? No real scientific Chemist devoted to science, and therefore keeping religiously its laws, will prepare blue pill in any other way than by triturating the conserve of rose till the quicksilver is killed. Uneducated Chemists suboxidize the quicksilver before triturating it, and produce, by this means, quite a different preparation. If the medical profession were aware how much their interest is endangered by uneducated Chemists, they would exert all their influence to put down the present system of Pharmacy.

Permit me now to say a few words in reference to the relation of the Apothecaries one to another. I have stated that the Board of Health prepares every year a Price Current. This Price Current refers only to the charge of prescriptions, for the retail, the Apothecaries of Hamburgh have agreed on much lower prices; but none of them are permitted to charge less than as agreed on. By this means is put a stop to every unfair competition and mean rivalry. In their scientific meetings every member is anxious to communicate their practical or scientific experience; and as every one of them is as well a manufacturing as dispensing Chemist, these Pharmaceutical Societies have done more to forward Chemistry in Germany than any of the Universities; and let me mention it here, that most of the eminent scientific Chemists in the Universities of Germany have been Apothecaries.

Now, Sir, I am perfectly aware that no Briton would submit to the arbitrary laws of my native country, and I for one heartily agree with them in this noble feeling; but it does not require arbitrary laws for a free people to carry out measures which are acknowledged as useful and even necessary. You allow that we Germans are advanced in Pharmacy, but having become aware of this fact, I am sure you will not long permit us to be ahead. There is a law which has done wonders with you, and this law will also compel you to overtake us soon—this law is the free will of a free people, which always knows how to find the right way.

ORIGINAL AND EXTRACTED ARTICLES.

NOTES UPON THE DRUGS OBSERVED AT ADEN, ARABIA.

BY JAMES VAUGHAN, ESQ.,
Member of the Royal College of Surgeons of England, Assistant Surgeon in the Bombay Army, Civil and Port Surgeon at Aden, Arabia.

Communicated by Daniel Hanbury.

(*Continued from page* 271.)

Copal.—This substance is brought from the coast opposite the island of Zanzibar and is said to be dug up from the earth, where it lies in irregular flakes.

The mines, if they may be so called, are worked by Seedees exclusively for the Imaum of Muscat, who is also the ruler of Zanzibar, and claims the produce as his private property. I have heard that in the same latitude (or nearly so) on the western coast of Africa, somewhere in the region of Congo, similar beds of this substance are found and worked by the Portuguese.

Sanguis Draconis, or Dragon's Blood, is known in Southern Arabia and Socotra, as also among the Somalis, by the name of دم الاخوين *Dum-ool-akhwein*, i. e., *the blood of the two brothers*. In the island of Socotra the tree affording it grows in luxuriant abundance, together with the plant yielding aloes. It is likewise to be found in Hadramaut and on the east coast of Africa, though but little of the drug is exported from the latter places, the natives being either ignorant of its uses and value, or too supine and lazy to collect it.

Dragon's blood, aloes, orchella weed and ghee, or liquid butter, are the principal and almost the only exports from Socotra. These are generally taken by the *boggalas* and native vessels which arrive there annually from the Persian Gulf about the month of February, after having touched at the principal towns on the coast of Southern Arabia, bringing with them dates (which are the staple commodity), small parcels of cloth, rice, sugar and iron, all which they barter for the native produce. The boats next proceed to Zanzibar where they dispose of the articles obtained at Socotra and which are thence transhipped for the Indian markets; they then return laden with grain and other merchandize about the month of April, revisiting for the usual barter trade several of the towns on the Arabian coast, and reaching the Gulf about the end of May.

A naval officer of great experience informs me, that whilst at anchor in the Muscat roads, between the 21st November and 10th December, 1835, he calculated from the number of native vessels which passed that port sailing westward and varying in size from 50 to 252 tons, that the freight of dates amounted to at least 12,880 tons. This fact alone indicates that an extensive commerce is kept up between the Persian Gulf, Southern Arabia, Socotra and Zanzibar.

Hitherto very little Dragon's blood has been imported into the Aden market, but as has already been remarked with regard to other drugs common in this region, the demand only seems wanting to call forth a plentiful supply.*

Dugga-root or Dagaboot, a medicinal root growing on the Somali coast. The natives of that part of Africa make use of it in nearly every ailment but especially for pain in the bowels, anorexia, and debility after fevers. From this I imagine it is an alterative tonic, but beyond this crude information I am unaware what the beneficial properties of the root are.†

* Lieut. Wellstead speaks of having observed *Dragon's Blood* produced in southern Arabia as well as in Socotra. The tree affording it he states to be *Dracæna draco* and from his description it would appear likely that such is the case. See *Travels in Arabia*, by Lieut. J. R Wellstead, F.R.S, Lond., 8vo, 1838, vol. ii., p. 449. Mr. Vaughan's specimen of *Socotrine Dragon's Blood* I have not yet had the privilege of examining.—D. H.

† Mr. Vaughan has alluded to this drug in the *Lancet*, Jan. 10, 1852, p. 41. A specimen of it with which he has favoured me, consists of straight, hard, wiry sticks, six to eighteen inches in length, and varying in thickness from that of packthread to that of a quill; externally covered with a thin reddish brown bark, internally whitish. The drug has but little taste or smell.—D. H.

KORARIMA CARDAMOM (Pereira*), *Kheil* or *Khil* of the Arabs. The fruit is met with in the market of Mussowah, whence I have obtained through a naval friend a considerable quantity as a specimen. Each fruit has been perforated, probably for the purpose of suspension on a cord while being dried. The drug could be procured in abundance were there a demand for it in commerce.†

WURRUS or WARAS ورس, a red powder used chiefly as a dye, is the produce of a plant resembling the Sesame. I am informed, that the plant rises to about five feet in height, bearing several separate bunches or clusters of small round seeds, which are covered with a description of pollen or flour; this, removed from the seed-clusters by gentle rubbing or shaking, constitutes the dye; the seeds are afterwards thrown away. Two kinds of *wurrus* are brought into this market. The best comes from the interior, principally from the towns of O Badan and Gebla and the districts of Yaffaee and Sjibul Rudfan. A second kind, brought by the Somalis of the opposite coast, comes from the neighbourhood of Hurrer; this is not so much valued and does not realize the price of the other sort. A considerable quantity of the dye I find is exported to Bombay; it is used principally by the people of Surat for the purpose of imparting a light brown yellow colour to their silks, which are much prized and worn by the native ladies. I believe that *wurrus* is used for silks only, and not for cotton or woollen stuffs. Besides being employed by the Arabs of this part as a dye, the colour produced being highly esteemed, they use it likewise as an internal medicine in cases of leprosy, and externally in solution as a lotion to remove freckles and pustules. Much of this dye finds its way to the Persian Gulf, where it is known under the name of *Asbery*. *Wurrus* sells in Aden for about twenty-four *rupees* the *maund*, but the African or inferior description realizes only from seventeen to eighteen *rupees* the *maund*.‡

ORCHELLA WEED, called *Shennch*, is abundant in this part of the world. There is any quantity of it on the Somali coast, but of an inferior quality to that collected in Aden and in the neighbourhood of Mocha. Latterly the Somalis have brought a quantity for sale, but as yet there are but few purchasers.§

CIVET.—Two kinds of civet, known by the respective names of *Zanzibar* or *Sowhale Civet*, and *Mussowah* or *Abyssinian Civet*, are found in the Aden bazaar. A considerable quantity of this highly-scented perfume is annually brought into Aden for sale, there being a constant demand for it by the Arabs of the interior, who greatly esteem it. It is principally employed by the females who consider it the height of politeness and gentility to be strongly perfumed with it, especially on great occasions and when going into company, so that the odour to the olfactory nerves of an European is often far stronger than what would be agreeable. The men put a small quantity in their turbans only and as a rule on no other part of their dress. Very little civet is exported, I believe, from this place by sea, nearly the whole being sent inland or used by the Arabs in Aden.

I find it is no uncommon custom for the natives of India who are in the habit of retailing this scent to adulterate it to a considerable extent with rosin and with the pulp of the plantain. The *Zanzibar* or *Sowhale civet* sells here for 1½ dollars per *ounce*, and the *Mussowah* or *Abyssinian civet* for about one dollar per *ounce*. Civet is brought for sale in large buffalo horns each containing from one to two pounds of the perfume.

AMBERGRIS.—Small quantities of this substance are collected on the Arabian coast and brought to Aden, where it sells for 25 *rupees* the pound. I am not aware that it is used medicinally by the Arabs of this district, but it frequently forms an ingredient in the aphrodisiacs employed by the Turks.

SUMN EL BAAR, *Fat of the Sea*.—A colourless substance, emitting a very powerful and offensive odour, which is frequently brought into Aden in large masses, sometimes of the weight of twenty pounds. It is found on the beach or floating on the sea all along this coast. To all appearance it is the produce of a cetaceous animal, most probably of a whale or a dolphin, of which it seems to be a portion of the blubber whence a great part of the oily matter has oozed out. The specimens which I have examined consisted chiefly of fibro-cellular tissue enclosing but a small quantity of spermaceti. The Arabs use it, when melted over a slow fire, as an unguent and consider it almost in the light of a specific in rheumatic affections.

PEARL-ASH.—An impure carbonate of potash in large dark or black circular cakes is brought into the Aden market every day and extensively used in washing clothes, &c., being much cheaper than soap and because it saves the native *dhobies** the expenditure of what a laundress at home calls "elbow-grease," a species of manipulation to which they are much averse. The wood affording this alkali grows in the immediate neighbourhood of Aden, and the process of combustion is constantly going on along the northern shore of the harbour. I find the Aden washermen pay about two rupees for each cake.

The foregoing sketch, imperfect as the writer knows it to be, affords, nevertheless, ample proof that this region abounds in numerous vegetable productions, which are profitable as articles of trade, and valuable in their medicinal and other uses. With some of these the commercial and scientific world are already acquainted, with others they are less familiar, and of a few it may be presumed that they know scarcely anything. With regard to science, and especially medicine, it is much to be regretted, that some eminent botanist does not turn his attention to this part of the world, where Nature has been so lavish in her precious gifts, and where a wide field of research is open to him, from which he might make many important and original additions to the present stock of medical knowledge, and thereby establish a high claim to the esteem and gratitude of his profession in particular, and of the scientific part of the community generally. Scarcely anything is known at present of Eastern Africa beyond the sea-board, and the same remark applies to Southern Arabia. What little is reported of the former country goes to support the anticipation, that it is rich, not only in such productions as coffee, cardamoms, gum arabic, gum mastic, myrrh, frankincense, manna, orchella, saffron, safflower, and other familiar drugs, such as have been enumerated in the foregoing paper; but also in a variety of shrubs, plants, and flowers, possessing properties which eventually might prove a great blessing to mankind. And with regard to Southern Arabia, famous even in the early ages of the world for its valuable vegetable produce, it appears almost unaccountable that this country should be well nigh as little known to us as it was to the learned in the days of the ancient Greeks and Romans.

Science may justly be styled the handmaid of trade, and in proportion as general information and civilization extend in this part, will trade increase and thrive. On the other hand, trade is already opening the road for researches such as I have recommended, and a traveller may now make his way with com-

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* *Elements of Materia Medica and Therapeutics*, vol. ii., p. 1136 (edition 1850).

† I am indebted to Mr. Vaughan for an abundant and fine specimen of this rare cardamom.—D. H.

‡ *Wurrus*, of which two samples have been received from Mr. Vaughan, consists of a dull red, granular, sand-like powder, mixed with small fragments of stalk, leaves, &c.

I presume it to be the *Usra* of Niebuhr, which he speaks of as "herbe qui teint en jaune et dont on transporte quantité de Mokha dans l'Oman;" vide *Description de l'Arabie, Amsterdam et Utrecht*, 1774, 4to, p. 133.—D. H.

§ Samples of Orchella weed of three qualities have been forwarded to England by Mr. Vaughan, viz.:

1. *Shennch from Socotra, first quality*. This consists of *Rocella fuciformis*, De Cand.

2. *Shennch from Socotra, second quality*, consists of *Rocella tinctoria*, De Cand., *Rocella fuciformis* and (?) *Parmelia perlata*.

3. *Orchella collected in Aden*, consisting entirely of *Rocella fuciformis*. An orchill manufacturer who has examined it, finds it to afford a fair amount of colouring matter.—D. H.

* *Dhobies*, Indian washermen.

parative ease to places which, a few years ago would have been pronounced incapable of access to the European.

Since Aden was declared a free port, the concourse of natives here from the opposite shores of Africa and from the sea-coast of Southern Arabia, has considerably augmented,—a satisfactory proof that trade is on the increase; and I am persuaded that, under judicious management, Aden bids fair to become the great mart of this part of the world. As these visitors and strangers learn more of our habits, and begin to apprehend that their own interests are in a measure bound up with ours, they will gradually lose their jealousy, and eventually become our guides to the homes which they inhabit. This nearer approach to us increases year after year, and the hope may be reasonably entertained, that the present generation of Somalis and Arabs who frequent Aden will not have passed away, before the skill and energy of Europeans shall have availed of this favourable feature to penetrate into their country and to explore its now hidden resources and treasures.

With regard to the general commerce of this region, I trust that the time is not distant, when British merchants will deem it worth while to inquire what prospects it holds out for successful speculation. America and France are before them in the field, and although I cannot assert how far their efforts have been prosperous, yet the simple fact that they are able to carry on business here and the other point which I have already stated regarding the increase of trade generally in these parts, may justly be regarded as sufficient criteria to warrant attention being called to the subject.

If the foregoing remarks shall in any degree tend to awaken interest, either in the lovers of science or in the mercantile community, and thus pave the way to the acquisition of the least benefit, the imperfect attempt of the writer will be more than compensated.

AMERICAN LARD.

BY F. CRACE CALVERT, ESQ.

During the numerous analyses I made some three years since of various articles of food employed in public establishments, I analysed several samples of American lard, and therefore may add to the fact already mentioned by Mr. George Whipple in your last number, that I found them to contain, in addition to starch, from 10 to 12 per cent. of water, and from 2 to 3 per cent. of alum, and about 1 per cent. of quick lime.

A few months ago I was able to ascertain that the operation is conducted in the following manner:—

The fatty matters, such as they arrive from America, are melted with a little water in false-bottomed copper pans, through which circulates a current of steam. The dirt and other heterogeneous matters fall to the bottom of the pans, and the clear grease is allowed to run into a wooden vessel, when it is stirred in contact with cold water; it is then put under revolving wheels, with a thick paste made of potato starch, mixed with a little potash alum, and quick lime, which appears to facilitate the taking up of the water and starch by the fatty matter.

The cause of the American lard appearing so white, is no doubt, the great division of the fatty matter through the interposition of the starch, water, and alumina.

The quantity of alum should be such that a small excess should remain to prevent the starch from becoming mildewed, and I believe that the manufacturer also adds it for the purpose of communicating to the lard the property of facilitating the raising and increasing the whiteness of the confectioners' paste, in which it is employed largely.

Royal Institution, Manchester, 17th January, 1853.

ON THE MANUFACTURE OF RESIN OILS.

BY F. CRACE CALVERT, ESQ.

I read in your last number a very interesting paper on resin oil, which has led me to believe that it may be useful to some of your numerous readers to be acquainted with a simple process I have discovered of almost entirely removing from resin oil its present noxious odour, which so much prevents its application in numerous instances, where, from its cheapness, it might be employed with great advantage.

My process consists in placing 100 gallons of the oil in a copper pan, or what is better, in a pan of glazed iron, and adding thereto by degrees 35 lbs. of sulphuric acid of sp. gr. 1.345. The whole is then well stirred and gently heated to a temperature of 300°. During this operation large quantities of gas and vapour are given off, the production of which is greatly facilitated by agitating the mass. The fumes having nearly ceased to arise, the whole is allowed to cool, and a clear brown liquor is decanted from a thick carbonaceous mass, which adheres to the bottom of the vessel, and it is distilled in the ordinary way. A copper still is preferred to an iron one for this operation, as it is less acted upon by the small quantity of vitriol which remains in the oil.

With the exception of the first and last products of distillation, the whole of the bulk of the oil distilled is nearly white, and it only requires to be heated at a low temperature, or by passing through it a jet of steam, to obtain the resin oil deprived, or nearly so, of any odour.

There is a simple contrivance which can be adopted to prevent by any chance the slight amount of acid which remains in the oil from acting upon the still. It consists in suspending in the centre of the still containing the oil a basket filled with chalk, which neutralizes, as the oil is set in motion by currents, any acid it may have retained.

The advantage of obtaining this cheap oil free from odour, and enabling it to be applied to various purposes from which it is now excluded, will, I believe, more than cover the slight expense of the above process and the loss of ten per cent. of the oil experienced in the working.

Royal Institution, Manchester, 17th Jan., 1853.

SOME NOTICES OF THE HURRICANE OF 1824.

BY W. HAMILTON, M. B.

The extensive destruction which has marked the progress of the formidable gale of the 26th and 27th of last month, that swept, with desolating fury, over the whole area of the British islands, gives an interest to the scattered details which yet survive, of the still more furious hurricane which some eight-and-twenty years ago spread ruin and desolation along the SW. coast of England, and was accompanied by a far greater and more rapid diminution of atmospheric pressure than was observed at Plymouth upon the recent occasion, or has perhaps been ever recorded in these islands.

Having recently stumbled, by the merest accident, upon a letter, giving some account of the fluctuations of the mercury in the barometer previous to, and during the progress of that gale, which I addressed to the editor of the *Devonshire Freeholder*, a local paper which has long ceased to exist, within a week after the event, I may perhaps be pardoned for recalling that letter from the oblivion into which it has fallen, and endeavouring to obtain a fresh lease of existence for the few facts it contains, by offering them for insertion in the pages of the Pharmaceutical Journal. Though not strictly Pharmaceutical, such phenomena, in their results, exert so considerable an amount of influence upon the sanitary condition of society, that an investigation of their details cannot be wholly destitute of interest to the Pharmaceutical student.

"TO THE EDITOR OF THE DEVONSHIRE FREEHOLDER.

"Sir,—The following table exhibits the state of the mercury in my barometer between nine o'clock on the morning of the 22nd inst. and the same hour on the 23rd, a period distinguished for one of the most furious and calamitous hurricanes ever witnessed, I believe, in this neighbourhood.

"The greatest depression of the mercury, at any former period, within the last four years, was at half-past eight o'clock in the evening of the 28th of December, 1821, when it was observed by Mr. Cox, optician at Devonport, at 27.98; while, upon the late occasion, I observed it at 27.87, or 0.11 of an inch lower.

"The elevation of my barometer above that of the gentleman who publishes his weekly register in the columns of the *Devonport Telegraph*, appears, from a mean of the results of his and my observations, at nearly the same hours, on the 22nd and 23rd, to be 296 feet. This result I obtained by the second of M. Ramond's methods, as given in the *Philosophical Magazine*, vol. xxxiii., p. 97. This circumstance will account, in some degree, for the greater depression of my barometer, at the hours most nearly corresponding to the periods of his observations on the 22nd and 23rd, as published in the *Telegraph*.

"As my watch was faster than the true time, I cannot be certain of the accuracy of the moments of observation, but the error of time may be easily corrected by any one who may have chanced to have observed the moment of the greatest depression of the mercury, which, in my table, is stated to have taken place between five and half-past four in the morning of the 23rd.

"Hoping you will pardon this intrusion on your columns, I have the honour to remain, &c.,

"WM. HAMILTON.

"*Plymstock, 29th Nov.*, 1824."

Register of Observations made at Plymstock.

1824. November.	Hour.	Barometer. Inches.	Barometer. Decimal Parts.	Thermometer.	
22	9 0 A.M.	29	24	48	Barometer 7 A.M. at Stonehouse, 28.24. See *Telegraph* of the 27th inst.
	Noon.	29	22	49	
	10 0 P.M.	28	58	52	
23	3 0 A.M.	28	14	"	
	3 35 "	28	05	"	
	4 30 "	27	93	"	
	5 0 "	27	87	"	
	5 30 "	27	88	"	
	6 13 "	27	92	"	
	9 0 "	28	14	50	

From the *Devonshire Freeholder* of the 4th of December, from which the foregoing details have been extracted, we learn that such was the force of the sea outside the Breakwater, that

"Great quantities of stones were thrown up from the south side, rolled over the top, and plunged into the Sound on the north side. The surface, which, before the gale, was nearly level, is now a complete mass of irregular stones, without form or order—the whole appearance of the erection is quite changed."

In the twenty-eight years which have elapsed since, the whole of the damage then occasioned has been repaired, and this noble structure stands among the most useful, as well as proudest trophies of human skill and perseverance; and the following testimonial to its utility, by the editor of the *Freeholder*, is too truthful to be omitted:—

"The inhabitants of the town are greatly indebted to those who were the means of having the breakwater erected, for, had it not been for that stupendous work, which presented to the fury of the waves so great a barrier, it was generally conceived the greatest destruction would have ensued to the lower parts of the town and neighbourhood."

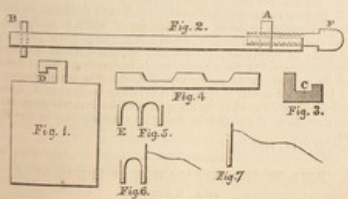
At Bovisand, which, from the direction of the wind, was but imperfectly protected by the breakwater, the injury sustained was, as recorded in the same paper, considerable.

"The pier," as it informs us, "sustained considerable damage; and the diving bell, which was erected there, and worked by means of machinery attached to the pier, and places adjacent, the bell vessel not being necessary, was thrown down, and partially buried in the ruins of part of the wall which was destroyed. A vessel was, by the fury of the gale (on the 22nd. inst.), broken adrift, and driven on shore, about a mile further in, under Staddon heights; the men were providentially saved, but most of them lost their clothes."

Deadman's Bay presented a most melancholy spectacle after the gale, the wrecks lining its beach three deep, and consisting, for the most part, of vessels of the largest tonnage, which had sought shelter within the then unfinished breakwater from the fury of the elements. During the gale of the 26th and 27th ultimo but one vessel, a schooner, which broke adrift from her moorings, was driven ashore under Mount Batten. The lowest reading of the barometer, at an elevation of about 30 feet above the mean level of the sea, which I observed, was 29.12 at a quarter past two in the morning; exceeding, by an inch and a quarter, the maximum depression observed in 1824. The following extract from my diary, though very imperfect, may be interesting for comparison with that of 1824:

1852. December.	Time of Observation.	Amount of Pressure. Inches.	Amount of Pressure. Decimal Parts.	Temperature.	
24	8 0 A.M.	29	94	55	Dark, fair, gale during the night
25	"	29	95	55	Fair, rain in the evening
26	"	29	91	54	Squally, gale and rain
27	2 15 A.M.	29	12	54	Gale
"	8 0 "	29	31	55	Squally
28	"	29	70	53	Fog, rain.

14, *Octagon, Plymouth, 4th January*, 1853.



A CHEAP METHOD OF CONSTRUCTING A GALVANIC BATTERY.

BY MR. W. SYMONS.

WHILE recently constructing a galvanic battery, an arrangement suggested itself which I have found very convenient and easily constructed, as one wooden

screw secures an effectual connexion between twenty or more plates, dispensing altogether with brass binding-screws, mercurial cups, or soldering the joints. As any person may easily and cheaply construct an efficient and durable battery, I send you a description of my arrangement, to publish if you think it of any value. Figure 1 represents the plates of zinc; for the negative metal I use plates of cast-iron, of the same shape but a little larger, about five inches square and one-eighth thick, and made like a grating, with the bars three-eighths of an inch apart; these an iron-founder cast for me at about one penny each; but of course plates of copper, &c., may be used instead. Figure 2 is a piece of wood, the size of which must be regulated by the size and number of the plates. A is a piece very firmly fixed to this with a female screw, in which a wooden screw F works. Figure 3 is a section of 2 at the end B; the size at C to be regulated by the plates at D. Figure 4 is a strip of copper, a little narrower than the groove at C. Figure 5 is the same, bent so that the plates at D fit into E; plates of gutta percha, or varnished wood, must be prepared, the same shape as the zinc; but six inches and a half or seven inches square, and some small squares of gutta-percha, the same width as the coppers, and as thick as it is intended the plates should be asunder: the piece of wood at B is moveable, and the width of the groove C.

To arrange the battery, place an iron plate in one of the coppers at E, slide it on a little way at B, next place one of the small pieces of gutta percha in the grove; next, one of the zinc plates in the copper, fig. 7, with the wire attached as the pole of the battery; then another small piece of gutta percha; then another iron plate in the second interval of the copper, fig. 5; then a large plate of gutta percha; then another iron in the first interval of another copper, fig. 5; then another small square of gutta percha; then a zinc plate in the last interval of the first copper, and so on for the number of plates required; ending with the copper, fig. 6, as the other pole, in which, of course, will be two iron plates; when all the plates have been slid on the wood, fig. 2, replace the small piece B, and screw the whole tight together. Thus you will have a compact battery, which can be plunged at once into the liquid and removed as quickly. No dividing cells will be required, as each zinc has iron on both sides, and the gutta percha plates dividing the contiguous iron plates will be, as proved by Faraday, effectual isolaters. The advantages of this battery are cheap materials, easy construction, great compactness, only requiring a varnished wooden trough in which it can be placed complete in an instant, and removed the moment the current is not required.

If Mr. M. Roberts's arrangement, described in Noad's Lectures, and in Lardner and Walker's Treatise is feasible, the peculiarity of which is using both sides of both plates, this battery can be so modified and the large gutta percha plates be dispensed with; an equal number of zinc and iron plates would then be required, and the middle interval of the coppers, fig. 5, be dispensed with; but although published by so respectable authorities, I doubt this arrangement, not only because I have failed myself in applying it advantageously, but A. Crosse, Esq., of Broomfield, has expressed to me his opinion of its incorrectness, and it was also, some time since, questioned in Sturgeon's Annals and in the Mechanic's Magazine.

Dunster, Dec. 11, 1852.

NOTE ON THE PREPARATION OF LIQUID GLUE.

BY M. S. DUMOULIN.

All chemists are aware, that when a solution of glue (gelatine) is heated and cooled several times in contact with the air, it loses the property of forming a jelly. M. Gmelin observed, that a solution of isinglass, enclosed in a sealed glass tube and kept in a state of ebullition on the water-bath for several days, presented the same phenomenon, that is to say, the glue remained fluid, and did not form a jelly.

The change thus produced is one of the problems most difficult of solution in organic chemistry. It may be supposed, however, that, in the alteration which the glue undergoes, the oxygen of the air or of the water plays a principal part; what leads me to think this is the effect produced upon glue by a small quantity of nitric acid. It is well known, that by treating gelatine with an excess of this acid, it is converted by heat into malic and oxalic acids, fatty matter, tannin, &c. But it is not thus when this glue is treated with its weight of water and with a small quantity of nitric acid; by this means glue is obtained which preserves nearly all its primitive qualities, but which has no longer the power of forming a jelly. Upon this process, which I communicated, is founded the Parisian manufacture of the glue which is sold in France under the title of "*colle liquide et inaltérable.*"

This glue being very convenient for cabinet-makers, joiners, pasteboard-workers, toy-makers, and others, as it is applied cold, I think it my duty, in order to increase its manufacture, to publish the process.

It consists in taking one kilogrm. of glue, and dissolving it in one litre of water in a glazed pot over a gentle fire, or, what is better, in the water-bath, stirring it from time to time. When all the glue is melted, 200 grms. of nitric acid (spec. grav. 1.32) are to be poured in, in small quantities at a time. This addition produces an effervescence, owing to the disengagement of hyponitrous acid. When all the acid is added, the vessel is to be taken from the fire, and left to cool.

I have kept the glue, thus prepared, in an open vessel during more than two years, without its undergoing any change. It is very convenient in chemical operations. I use it with advantage in my laboratory for the preservation of various gases, by covering strips of linen with it.—*Comptes Rendus*, Sept. 27, 1852, p. 444, and *Chemical Gazette*.

ON THE ACTION OF ALKALIES ON SUGAR.

BY DR. FR. MICHAELIS.

(*Concluded from page* 350.)

The potash lye employed in the preceding experiments being entirely consumed, a fresh quantity was prepared, having, at 17.5° C. (63.5 F.), a specific gravity of 1.0681, and containing 4.52 per cent. potash. 70.022 grms. of potash lye (equal to 3.165 grms. potash); 82.553 grms. of water; and 50.000 grms. of sugar carefully dissolved and heated to 70° R. (189.5 F.), were, after having become cold, restored by water to the original weight of 202.575 grms., and a portion filtered; specific gravity at 16.5° C. (61.7 F.) 1.12555; colouration in the polarization tube brownish yellow; right-handed rotation 94 per cent. according to Soleil, 36° according to Mitscherlich, equal to 92.31 per cent. of sugar.

101.787 of the original liquid were neutralized with bone charcoal, heated to 70°R., (189.5 F.) the weight restored by water, and filtered; specific gravity at 16.5° C. (61.7 F.) 1.13230; right-handed rotation 98 per cent. according to Soleil, 37.0° according to Mitscherlich, equal to 94.87 per cent. of sugar.

82.8 grms. were filtered through 10.35 grms. of bone charcoal; specific gravity at 16.5° C. (61.7 F.) 1.13075; in the polarization tube almost colourless; right-handed rotation 97 per cent. according to Soleil, 38° according to Mitscherlich, equal to 97.43 per cent. of sugar.

70.022 grms. potash lye, 83.553 grms. of water, and 50.000 grms. of sugar, were carefully dissolved and boiled up. When cold the weight was restored by water, and 100.2 grms. of the solution mixed with 12.3 grms. bone charcoal and filtered; specific gravity at 16.5° C. (61.7 F.) 1.125; colour in the polarization tube brownish; right-handed rotation 93 per cent. according to Soleil, 35.5° according to Mitscherlich, equal to 91.03 per cent. of sugar.

101.787 grms. of the saccharine solution were treated by carbonic acid, the mixture boiled, the weight restored by water after cooling, 12.5 grms. bone charcoal added, and the liquid filtered; specific gravity at 16.5° C. (61.7 F.) 1.13080; in the polarization tube a slight yellowish colouration; right-handed rotation 96 per cent. according to Soleil, 37° according to Mitscherlich, equal to 94.87 per cent. of sugar.

70.022 grms. of potash lye, 83.553 grms. of water, and 50.000 grms. of sugar having been carefully dissolved and boiled down at 83° R. (218.75 F.), the residue was, after having become cold, restored by water to the original weight of the solution, and 101.787 grms. of the liquid mixed with 12.3 grms. bone charcoal

and filtered; specific gravity at 16.5° C. (61.7 F.) 1.1231; brownish colouration in the polarization tube; right-handed rotation 95 per cent. according to Soleil, 35° according to Mitscherlich equal to 89.74 per cent. of sugar.

101.787 grms. of the filtered liquid were neutralized by carbonic acid, the liquid boiled, and left to become cold, the original weight restored by water, 12.5 grms. bone charcoal added and filtered; specific gravity at 16.5° C. (61.7 F.) 1.13095; yellowish colouration in the polarization tube; right-handed rotation 96 per cent. according to Soleil, 36.5° according to Mitscherlich, equal to 93.59 per cent. of sugar.

A mixture of 140.044 grms. potash lye, 167.906 grms. of water, and 100.000 grms. of sugar was heated to 70°, the weight restored by water, and a portion of it filtered; specific gravity at 13° C. (55.4 F.) 1.12230; brownish yellow colouration in the polarization tube; right-handed rotation 94 per cent. according to Soleil, 36° according to Mitscherlich, equal to 92.31 per cent. of sugar.

The unfiltered residue of the last liquid was saturated with carbonic acid, heated to 70°, and the weight restored by water; specific gravity at 13° C. (55.4 F.) 1.12720; in the polarization tube the liquid had a yellowish tinge; right-handed rotation 98 per cent. according to Soleil, 37° according to Mitscherlich, equal to 94.87 per cent. of sugar.

100 grms. of the liquid, mixed with 49.124 grms. of bone charcoal and filtered; specific gravity at 13° C. (55.4 F.) 1.12605; in the polarization tube the liquid appeared clear like water; right-handed rotation 97 per cent. according to Soleil, 38° according to Mitscherlich, equal to 97.43 per cent. of sugar.

140.044 grms. of potash lye, 167.106 grms. of water, and 100.000 grms. of sugar were dissolved and boiled; when cold the weight was restored by water, and a small quantity of the liquid filtered; specific gravity at 13½ C. (56.3 F.) 1.12830; colouration in the polarization tube brownish-yellow; right polarization ninety-four per cent. according to Soleil, 34½° according to Mitscherlich, equal to 88.46 per cent. of sugar.

294 grms. of the unfiltered liquid were saturated with carbonic acid, boiled up, and the original weight restored by the addition of water to the cold residue. A portion of this liquid filtered had, at 13½° C. (56.3 F.), a specific gravity of 1.12710; in the polarization tube it appeared less intensely brownish-yellow; right-handed rotation 97 per cent. according to Soleil, 36° according to Mitscherlich, equal to 92.31 per cent. of sugar.

200 grms. of the unfiltered liquid, mixed with 49.124 grms. of finely-powdered bone charcoal and filtered; colouration in the polarization tube slightly yellowish; right-handed rotation 76 per cent. according to Soleil, 37° according to Mitscherlich, equal to 94.87 per cent. of sugar.

75.000 grms. of sugar; 24.735 grms. of potash lye, containing 1.484 grms. of caustic potash; 400.782 grms. of water; 1.613 grms. of burnt Carrara marble, in 300 parts of beet-juice (lime and potash are generally contained in the proportions given above, if, instead of the soda, which is also contained in juice, one equivalent of potash be taken) were cautiously mixed and boiled up, and carbonic acid conducted in the solution, till the carbonate of lime commenced to redissolve; the liquid was then boiled, the weight raised by water to 504.083 grms. and filtered; specific gravity at 21° C. (69.8 F.) 1.05425; colouration slightly yellow; right-handed rotation 37 per cent. according to Soleil, equal to 14.87 per cent. of sugar; 22° according to Mitscherlich, equal to 14.78 per cent. of sugar.

38.011 grms. of potash lye, 41.776 grms. of water, 25.000 grms. of sugar, and 33.000 grms. of recently precipitated oxide of iron were carefully mixed and heated to 76° R. (20.3 F.), when the oxide of iron became completely dissolved. The solution had the dark colour of a solution of acetate of iron; it was neutralized with carbonic acid, heated to 70° R. (189.5 F.), the cold residue was raised to the original weight, mixed with twenty-five grms. of charcoal and filtered. Specific gravity at 18° C. (64.4 F.) 1.12435; brownish-yellow colouration in the polarization tube; right-handed rotation 96 per cent. according to Soleil, 35° according to Mitscherlich, equal to 87.74 per cent. of sugar.

The boiled solution of 33.011 grms. of potash lye, 41.776 grms. of water, 25.000 grms. of sugar, and 60.033 grms. of oxide of iron, was neutralized with carbonic acid, the cold residue increased by water to the weight of 101.820 grms., mixed with twenty-five grms. of charcoal and filtered; but the colour of the liquid being still too dark brown to determine its polarization, twenty-five grms. of charcoal more were added, and the liquid again filtered. Specific gravity at 16½° C. (61.7 F.) 1.12120;

colour in the polarization tube brownish yellow; right-handed rotation 96 per cent. according to Soleil, 35° according to Mitscherlich, equal to 89.74 per cent. of sugar.

These experiments show that when caustic potash is mixed with a saccharine solution containing more sugar than can chemically combine with the potash, which for one part of potash amounts to 5.422 parts of sugar, then,

1. The potash destroys the polarizing property of the sugar which is combined with it, and one part of potash causes the polarization of 0.90 parts of sugar according to Soleil, and of 1.21 parts according to Mitscherlich, to disappear.

2. When such a solution is heated to 70° R. (189.5 F.), and neutralized by an acid, only a portion of the sugar combined with the potash regains its polarizing property. For one part of potash the polarizing property is lost in 0.47 parts of sugar according to Soleil, and in 0.40 parts according to Mitscherlich.

3. If the solution be boiled and neutralized by an acid, 0.63 parts of sugar according to Soleil, or 0.81 parts according to Mitscherlich, lose their polarizing property for one part of potash.

4. If the solution be boiled down to 83° R. (218.75 F.), and neutralized by an acid, 0.63 parts of sugar according to Soleil, or 1.01 according to Mitscherlich, lose their polarizing property.

5. The action of potash upon sugar is not increased by the presence of lime.

6. If oxide of iron be contained with the caustic potash in the saccharine solution, and the latter heated to 70° R. (189.5 F.), and neutralized by an acid, the loss of polarizing sugar amounts to 0.63 parts according to Soleil, and to 1.62 parts according to Mitscherlich, for one part of potash.

7. If oxide of iron be present with potash in the saccharine solution, and the latter be boiled and neutralized by an acid, the loss of polarizing sugar for one part of potash is, according to Soleil 0.63 parts, according to Mitscherlich 1.62 parts.

Moreover, these experiments show that—

8. Boracic acid is at common temperature unable to separate sugar from potash.

9. In order to obtain correct results by Soleil's and Mitscherlich's instruments, the liquid must be perfectly clear like water, otherwise, if it be coloured, that of the first indicates more sugar than the liquid actually contains, that of the latter less. With slightly coloured liquids the medium of the proportions indicated by both instruments approaches nearest to the truth. For sugar manufactories Mitscherlich's instrument is to be recommended, on account of its cheapness, the price being only twenty-four Prussian dollars (£3 12s.), whilst that of Soleil's costs ninety-five dollars £14 5s.)

On the other hand, however, it cannot be denied, that for colourless liquids the power of polarization can be more accurately determined by Soleil's instrument than by that of Mitscherlich. For very correct examinations it might therefore be advisable to employ both instruments simultaneously.

3. *Action of Carbonate of Potash on Sugar.*—297.774 grms. of water, 5,000 grms of carbonate of potash, and 100.000 grms. of sugar were carefully dissolved, and fifty grms. of this solution filtered. At 12½° C. (54.5 F.) the filtrate had a specific gravity of 1.11843, appeared in the tube clear like water, and rotated to the right, according to Soleil 100 per cent., according to Mitscherlich 39°, equal to 100 per cent. of sugar. The residue of the liquid was heated to 70° R. (189.5 F.) After having become cold the original weight was restored by water, and fifty grms. of it filtered. At 13½° C. (56.3 F.) the liquid had a specific gravity of 1.11830, a slightly yellowish colour in the polarization tube, and rotated to the right, according to Soleil 100 per cent., according to Mitscherlich 39°, equal to 100 per cent. of sugar.

The remaining unfiltered liquid was reboiled, the original weight restored by water, and a small quantity of it filtered, had at 13½° C. (56.3 F.) a specific gravity of 1.11830; in the tube it appeared somewhat more intensely yellowish than the foregoing, and rotated to the right, according to Soleil 99½ per cent. C., according to Mitscherlich 38½°, equal to 98.72 per cent. of sugar.

The remainder of the last liquid was boiled down to 83° R. (218.75 F.), the former weight restored by water, and a small portion of it filtered. At 13½° C. (56.3 F.) the specific gravity was 1.11835; in the tube its colour was intensely yellow, and its right-handed rotation, according to Soleil, 100 per cent., according to Mitscherlich 38°, equal to 97.43 per cent.

141.21 grms. were mixed with ten per cent. of finely powdered animal charcoal, and filtered. The liquid had now at 13½° C. (56.3 F.), 1.11735 sp. gr. in the tube, a slight

yellowish colour, and rotated to the right according to Soleil, 99 per cent.; according to Mitscherlich, 38½°, equal to 98.07 per cent. sugar.

5,000 grms. of carbonate of potash, 277.724 grms. of water, and 100.000 grms. of sugar were dissolved and boiled to 95° R. (245.75 F.), the original weight having been restored by water; the liquid had at 13½° C. (56.3 F.), 1.11770 sp. gr., was brownish-yellow in the tube, and rotated to the right, according to Soleil 99 per cent.; according to Mitscherlich 37°, equal to 94.87 per cent. sugar.

250 grms. were filtered through ten per cent. animal charcoal, sp. gr. at 13½° C. (56.3 F.), .1630, colour in the tube, yellowish; right-handed rotation according to Soleil 98 per cent., according to Mitscherlich 38°, equal to 97.43 per cent.

With both liquids, that which had not been filtered through charcoal, and with that which had been filtered through charcoal, the following experiments were performed:

105 grms. of the unfiltered portion were precipitated with alcohol and tartaric acid, and the bitartrate of potash thus obtained, weighed 3.567 grms., it ought to have been 3.547 grms.

156 grms. of the filtered liquid were treated in the same manner. The bitartrate of potash weighed 4.824 grms., and, according to the quantity of potash obtained in the foregoing experiments, it ought to have weighed 5.002 grms.; 0.178 grms. were therefore lost; these are equal to 0.979 grms. carbonate of potash, which were removed from the solution by 15.6 grms. of animal charcoal, so that 100 parts of the latter take up 0.45 parts of carbonate of potash. These experiments prove: that carbonate of potash decomposes sugar in a saccharine solution of 80° R. (212 F.), and acts more perniciously upon sugar than caustic lime, but less so than caustic potash, for the decomposing property of one part of carbonate of potash amounts:—

	At 80° R. (212 F.)	At 83° R. (218.75 F.)	At 95° R. (245.75 F.)
According to Soleil to	.....0.1 per cent.	...0.269 per cent...	0.4 per cent. of sugar.
According to Mitscherlich	0.25 "	...0.386 "	... 0.51 " "

Pharm. Central Blatt, 1852.

UPON CORIANDER OIL.

BY A. KAWALIER.

The fruit of *Coriandrum sativum* was pounded and subjected to distillation with water. The oil which swims on the water which distils over is yellowish, nearly colourless, and possesses the odour and taste of coriander in a high degree. In a very diluted state the odour of this oil resembles that of orange-blossoms. Its specific gravity at 57° F. is 0.871, its boiling-point 302° F. In ascertaining the composition of this oil, for the first and second experiments it was allowed to stand over chloride of calcium; for the third, a large quantity of the oil was exposed in a retort on the oil-bath to a temperature below its boiling-point. The portion of oil which came over last was employed for the analysis. The air was removed from the distilling apparatus during the investigations by means of carbonic acid. The analysis gave—

Carbon	77.62	78.01	77.73	10=750.0	77.92
Hydrogen...	11.64	11.69	11.63	9=112.5	11.69
Oxygen.....	10.74	10.30	10.64	1=100.0	10.39

The formula $C_{10}H_9O$ is the same that expresses the composition of Borneo camphor. Coriander oil is therefore to be considered as the hydrate of an oil having the same composition as oil of turpentine, $C_{10}H_9O=C_{10}H_8+HO$.

If the oil, mixed with anhydrous phosphoric acid, be repeatedly submitted to distillation, a yellowish oil, of a nauseous odour, of the composition of oil of turpentine, is obtained. This contains—

Carbon	88.28	10=750	88.23	
Hydrogen....	11.78	8=100	11.77	

A stream of muriatic acid was passed into the crude oil, care being taken, by surrounding the vessel with ice, that the temperature should not rise too high. No crystalline compound was obtained in this manner. The product of the operation was washed with water to which some carbonate of soda had been added, dried over chloride of calcium, and submitted to analysis. It gave—

Carbon	67.51	67.51	40=3000.00	67.81	
Hydrogen....	10.50	9.52	35= 437.50	9.89	
Chlorine.....	20.40	20.40	2= 886.56	20.04	
Oxygen.....	1.59	2.57	1= 100.00	2.26	

$C_{10}H_{35}Cl_2O=(C_{20}H_{18}HO+HCl)+(C_{20}H_{18}ClH)$.

Another portion of powdered coriander, distilled with water, gave an oil agreeing in all its properties with the above-mentioned. It was deprived of water by chloride of calcium, and submitted to distillation by itself at a temperature below its boiling-point. The portion first evaporated possessed (as shown by analysis I.) the same composition as that which came over last (analysis II.):—

	I.	II.		
Carbon	85.67	85.47	80=6000.0	85.41
Hydrogen...	11.58	11.59	66= 825.0	11.74
Oxygen.....	2.75	2.94	2= 200.0	2.85

$C_{80}H_{66}O_2=4(C_{20}H_{16})+5HO$, or $2(C_{20}H_{16})+2(C_{20}H_{18}HO)$.

Coriander oil, according to these experiments, is an oil of the camphene family, and contains various quantities of hydrate-water, which can be extracted by anhydrous phosphoric acid (not by chloride of calcium), in consequence of which it passes over into a hydrocarbon isomerous with oil of turpentine. The fruit of the coriander is frequently employed for the seasoning of cakes and similar articles. It follows, from the above results, that the coriander belongs to the spices of the camphene group, in which are included cloves, pepper, juniper, cummin, parsley, calamus, the rinds of citrons, oranges, and limes, and wormwood.—*Sitzungsber. da Kaiserl. Akad. da Wiss.*, ix., p. 313, and *Chemical Gazette*.

GLYCERIN OINTMENT.

The following formula for Glycerin Ointment as an application for chapped hands, &c., is recommended by Mr. John H. Ecky, a correspondent of the *American Journal of Pharmacy*:—

℞ Spermaceti, ℥ss.
White wax, ℥j.
Oil of almonds, ℥ij. (f.)
Glycerin, ℥j. (f.)

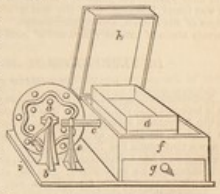
Melt the wax and spermaceti with the oil of almonds at a moderate heat, put them into a Wedgewood mortar, add the glycerin, and rub until well mixed and cold.

PATENT SIEVE.

BY MR. SAMUEL HARRIS, SPRINGFIELD, MASS.

Agents for Philadelphia, Charles Ellis & Co.

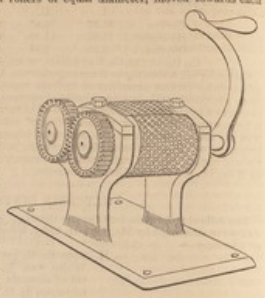
It consists of an iron wheel, axle, and crank, *a*, having an eccentric groove sunk into one of its sides, so as to present six wave-like depressions and elevations. The wheel is firmly supported by the cast-iron standard *b*, on a stout wooden base, *i*; another iron standard, *e*, supports in a smooth groove, and against the wheel, the end of the horizontal iron bar, *c*, from which an iron pin projects into the groove of the wheel. The other end of the bar passes through the side of the box *f*, and is pinned to the square sieve *d*, which works smoothly in a horizontal direction on ledges within the box; *g*, is a drawer beneath to catch the powder as it passes, and, *h*, a tightly-fitting cover, which prevents the escape of dust, without impeding the motion of the sieve. It will be at once perceived, that on turning the crank, the horizontal bar will be forced backward and forward by the zig-zag direction of the groove, which motion it communicates to the sieve; each revolution of the crank causing six distinct jerks of the sieve. There are sieves of two or three sizes, so as to yield powder of different degrees of fineness.



ROTARY PILL MACHINE.

BY MESSRS. POND AND MORSE, RUTLAND, VERMONT.

This apparatus is intended as an expeditious means of making quantities of pills. It consists essentially of a pair of rollers of equal diameter, moved towards each other, above, by accurately made cogs attached to the end of each by means of a crank attached to the axle of one of them. The surface of each roller is penetrated at regular distances with hemispherical cavities, arranged with mathematical precision in such a manner, that when the rollers press together each successive row of cavities meets the corresponding one on the other roller, so that at the point of contact, a row of spherical moulds is produced. The rollers are supported firmly on a cast-iron base and supports. The rollers are approximated, when required, by lateral screws passing through the sides of the supports not seen in the figure. In using this machine, the pill mass should have a uniform consistence of a certain firmness, not too tough or adhesive. It should be formed into ribbon-like strips, of about one-eighth of an inch in thickness, and while one person turns the crank, which requires a considerable degree of force, another feeds the rollers as they gradually draw in the mass, and clear the moulds of such pills as adhere. The difficulty of disengaging the pills from the cavities has sometimes been found an objection, to remedy which, a plan has been tried with partial success. Two bands of thin gum elastic, passing over each other, and round another cylinder, running parallel, are supported on a pinion attached to an arm extended on either side from the main support. The mass was fed between the two bands, which, from their elasticity, took the shape of the matrices when pressed on by the pill mass, and after passing the point of contact, the bands by contracting, forced out the pills. It was found, however, that the bands after use for a time, were cut by the sharp edges of the moulds, and became useless. We think the machine is only adapted for certain kinds of masses which are of good consistence, and not liable to adhere.



ON FLUID EXTRACT OF RHUBARB AND SENNA.

BY WILLIAM PROCTER, JUN.

Notwithstanding that two preparations of rhubarb and senna are already known, it is believed that the new one, now proposed, possesses sufficient claims to gain for it the favourable opinion of Physicians and patients in many cases where a cathartic is needed, simply as such, or in connection with other medicines. It is well known that senna has little, if any, tonic influence on the alimentary surfaces; that an over-dose has a depleting effect, often inconvenient, and that griping is a frequent attendant on its exhibition. On the other hand it is equally understood, that rhubarb is remarkable for being a sort of therapeutical paradox, in so far as it possesses both a purgative and an astringent property, the latter coming into play *after* the former has manifested itself, and thus repairing, as it were, its effects. It is also well known, that this astringent or tonic action is so strongly marked, that it is necessary in most cases to combine it with some other cathartic to overcome or modify this peculiarity when a simple cathartic is needed. By the union of these two drugs in the concentrated form presented by a fluid extract, and in a due proportion, a resulting cathartic action is obtained which is safe, unattended by

unpleasant symptoms, and not followed by constipation when the dose has been properly graduated. It has been ascertained that the associations of alkalies and alkaline salts with rhubarb and senna, has a tendency to prevent their unpleasant griping effects, and in the case of senna to increase its activity. The introduction of the bicarbonate of potassa is with this view, and the aromatics from their carminative properties also aid. The following is the formula :—

Take of senna, in coarse powder	twelve ounces (troy)
Rhubarb, in coarse powder	four ounces
Bicarbonate of potassa	half an ounce
Sugar	eight ounces
Tincture of ginger	a fluid ounce
Oil of cloves	eight minims
Oil of anniseed	sixteen minims
Water and alcohol of each a sufficient quantity.	

Mix the senna and rhubarb (by grinding them together in a convenient way), pour upon them two pints of diluted alcohol (U. S. P.), allow them to macerate twenty-four hours, and introduce the mixture into a percolator furnished below with a stop-cock or cork to regulate the flow. A mixture of one part of alcohol and three of water should now be poured on above, so as to keep a constant but slow displacement of the absorbed menstruum, until one gallon of tincture has passed. Evaporate this in a water-bath to eleven fluid ounces, dissolve in it the sugar and bicarbonate, and after straining, add the tincture of ginger, holding the oils in solution and mix. When done the whole should measure a pint.

Remarks.—If the percolation has been properly conducted, the ingredients will have been sufficiently exhausted when six pints of fluid have passed. As by far the larger portion of soluble matter passes in the first two pints, it is well to set these aside and evaporate them separately to six fluid ounces, subsequently adding to the other liquid when it has been reduced to five fluid ounces. As the cathartic principles of senna and rhubarb are very susceptible to injury from heat, especially in contact with the air, the propriety of using the best available means for conducting the evaporation need not be urged. When the evaporation is conducted in open vessels, some advantage is gained by adding the sugar to the tincture and continuing the process until it measures fifteen fluid ounces. The sugar protects the extractive matter from oxidation, and more completely suspends or dissolves the resinous part of the rhubarb contained in the tincture. The bicarbonate should not be added to the extract while it is above 140° Fahr. and should be reduced to powder previously.

It may be objected to this formula that we already have fluid extracts of rhubarb and of senna of the same ratio of strength, and that when Physicians need such an association they can mix them. In answer it may be stated that the cases where a simple cathartic is needed, are so numerous that this preparation will be found useful to the Physician, and a good medicine for travellers and others who resort to this kind of purgative habitually.—*American Journal of Pharmacy.*

ON THE MANUFACTURE OF WAX CANDLES.

Under the name of wax are included substances of various origin, and of very different composition. The wax employed in the manufacture of candles is secreted by the honey bee, which has the power of producing this substance from its food (sugar). At one time it was thought that the bee collected the wax ready formed from plants, until Liebig advanced the contrary opinion, which was subsequently corroborated by the experiments of MM. Dumas and Milne Edwards.

A wax known as Chinese wax, and resembling spermaceti in appearance, was formerly supposed to be a vegetable wax; but the researches of Sir George Staunton and M. Stanislaus Julien have demonstrated that it is the secretion of a male insect, the Coccus ceriferus, which deposits it on the tree on which it feeds, particularly the Rhus succedaneum. We owe to Mr. Brodie a knowledge of the true chemical composition of wax. This Chemist, by his recent elaborate researches, has shown that Chinese wax is a compound of a peculiar fatty acid (*cerotic*) and the oxide of an alcohol radical (*cerotyl*), and is consequently cerotate of oxide of cerotyl. Ordinary bees'-wax he finds generally to contain twenty-two per cent. of free cerotic acid, which is soluble in alcohol, and, with potassa, forms readily a soap. The residue, which is nearly insoluble in alcohol, and which has been usually called

myricin, he has shown to be a compound of palmitic acid and the oxide of another alcohol radical (*melissyl*), that is, palmitate of oxide of melissyl. He has likewise been able to prepare from wax two new solid hydrocarbons similar to paraffin.

Paraffin would be much too costly to be converted into candles if made from wax, as its preparation entails a considerable loss of material; it is, nevertheless, desirable that it should be obtained cheaply from some source, as it is much better adapted than any other substance for illuminating purposes, from its containing no element besides carbon and hydrogen, which are united in equal equivalents. It is therefore exactly of the same composition in a hundred parts as olefiant gas, which gives to ordinary coal and oil gases their illuminating power. Paraffin candles have been made from paraffin obtained by distilling bituminous schist; but far more interesting specimens are those produced by James Young, which seem to realize the great problem which the rare sagacity of Liebig pointed out as far back as ten years ago. "It would certainly be esteemed one of the greatest discoveries of the age," says he. "If any one could succeed in condensing coal-gas into a white, dry, solid, odourless substance, portable, and capable of being placed upon a candlestick or burned in a lamp." Now this very problem Mr. Young appears to have accomplished by distilling coal at a comparatively low temperature, whereby he obtains, instead of gas, the product of intense heat—a mixture of liquid and solid substances; the former capable of being burned in lamps like sperm oil or of being used for lubricating machinery, the latter yielding a beautiful mould candle, as solid and white as any prepared from paraffin from other sources. The Reporters have not as yet been able to obtain a fuller account of the economical bearings of Mr. Young's process, which will most likely be considered in the Report upon another class; but they confidently hope that this truly beautiful discovery will not meet with similar difficulties as the plan proposed some years ago for making paraffin candles out of Irish peat. If coal-paraffin can actually be obtained in sufficient quantity and at moderate cost, we may witness another revolution in the processes of illumination; and the brilliant discoveries of Chevreul, but lately threatened by the splendour of the electric light, may be eclipsed by the general adoption of solidified coal gas candles.

In most countries wax intended to be made into candles is previously bleached by a process presently to be described. That this, however, is not always the case, we find by specimens exhibited in the Egyptian and Tunisian Courts. The candles in the latter, which we may infer resemble those of the classical ancients, are true yellow wax "dips," and have a very ungainly appearance. The bees'-wax from which they are made is principally produced in the province of Kirwan; and the primitive method usually adopted for their manufacture consists in merely melting the wax in a proper vessel, and then dipping the wick repeatedly into it. Although such is the usual mode, the wax is sometimes bleached, and of course finer candles produced; but none such were exhibited. No animal fat is employed in Tunis for the manufacture of candles, although stearic candles of European manufacture are imported, and are in general use.

Wax is more valuable when bleached, not only on account of its greater beauty, but also from the removal by this operation of impurities which would clog the wick during combustion. It may be bleached by chlorine; but the process is of no value, because its constituents retain a portion in combustion, and hence hydrochloric acid is given off in burning.

The method of bleaching employed is very simple, although tedious. The following, with some trifling variation, is the plan adopted in most countries:—

Wax Bleaching.—The wax is cut up into small pieces and placed in a vat, into which steam is made to pass through a perforated coil of pipes: a small quantity of very dilute sulphuric acid being added, in the proportion of one pint measure of strong sulphuric acid (oil of vitriol) to one ton of wax, and the whole well agitated for some time. This addition of sulphuric acid facilitates the separation of impurities which subside into the acidulated water.

As soon as, by subsidence, the wax has become bright, it is removed into a trough, with holes in the bottom about the size of an ordinary quill. The melted wax runs through these holes in small streams on to a wooden cylinder, which is made to revolve, and the lower half of which is immersed in a cistern of cold water. The motion of the cylinder carries a layer of water, on which the streams of wax fall

and form exceedingly thin ribbons, varying from half an inch in breadth. These ribbons, by the revolution of the cylinder, dip under water, and as they rise upon the opposite surface are removed, and spread out thinly and evenly on tables, placed in the open air, so as to be exposed to the action of the sun and air for a period varying from five to ten weeks. Once or twice during that period the wax is again subjected to the same process of melting; it requires also frequent turning, so as to present every portion to the bleaching agency of sunlight.

The fusing point of wax is raised by bleaching for yellow wax fuses between 62° and 63° C. (144° and 146° F.), and bleached wax between 64° and 65° C. (147° and 149° F.).

All waxes are not found to bleach with equal facility, according to the statement of Mr. Barclay. For example, English, Hamburgh, Odessa, Portuguese, Mogadore, Zanzibar, East and West Indian, and North American waxes bleach very readily, whilst those from Cuba, Dantzic, Konigsburg, Gambia, and Gabon, are only bleached with difficulty, and seldom acquire a good colour.

Notwithstanding the difficulty with which Gambia wax is bleached, and its liability to become of a rusty brown, that country furnishes the greater part of the wax which is imported into Great Britain. Large quantities are likewise imported from Mogadore, the East Indies, particularly Ceylon and Singapore, and North America. The Mogadore wax is frequently largely adulterated with fat.

From Brazil a curious wax has been imported, the product of a black bee, which hives under ground. It is soft, and exceedingly tenacious, and of a dark mahogany colour. It does not appear in the slightest degree bleached after exposure to the sun. A considerable quantity might be imported, but no use has yet been found for it.

The English wax is the most esteemed of all; but the small quantity produced is absorbed for various purposes without bleaching, on account of its fine quality, and its brightness and fragrancy.

In 1850 the quantity of bees'-wax imported for home consumption into Great Britain was 10,761 cwt., besides a small quantity of vegetable wax amounting to only five cwt. There is no duty on wax. 1067 lbs. of wax candles were also imported, and paid £9 duty.

Wax is not well adapted for moulding on account of its tendency to adhere to the mould, and its great contraction in cooling; and though these difficulties may be overcome, yet it is found more advantageous to make wax candles in the manner about to be described, as they are found to burn much better.

The first process consists in warming the wicks in a stove, and then suspending them to a hoop placed over a vessel of melted wax. The workman pours the melted wax with a ladle on to each wick in succession, and at the same time causes the wick to revolve on its axis by the motion of the fingers. When the candles are about one-third made they are allowed to cool for a time, and the operation of pouring repeated until the candles are about half made, which is ascertained by the eye or by weighing. Whilst still warm they are removed from the hooks and subjected to a process of rolling between two marble slabs, so as to render them uniform in thickness. The upper end of each candle is now formed by cutting down the wax to a metal tag which covered one end of the wick. The candles are then again suspended to the hoops, the end of which had previously hung downwards being now upwards, and the operation of basting and rolling repeated as often as necessary. Lastly, the lower ends of the candles are cut off to make them of equal length.

The wicks of wax candles are always made of twisted unbleached Turkey cotton, the fibre of which appears better to resist the temperature of the highly heated wax during combustion. Plaited wicks are not adapted for wax candles, as the plaiting, by diminishing the capillary action, entails the employment of so large a wick that it obscures the light, besides which it is apt to curl round and round in the flame, and to collect a quantity of soot.

The large wax candles used in churches are formed by laying the wick on to a slab of wax, which is then folded over on the wick, and the candle finished by rolling.

Long wax tapers are made by winding the wick on a drum, and then leading it under a guide roller, placed in a trough of melted wax. From this it passes through a series of holes, progressively smaller, on to a second drum, the operation resembling somewhat that of wire drawing. A little turpentine is added so as to render the wax pliable enough to wind.—*Reports of Juries.*

PHOSPHORUS PASTE FOR DESTROYING VERMIN.

Several recipes have been published for preparing phosphorus paste, but, in following the instructions which have been given, it has sometimes been found difficult to get the phosphorus equally mixed throughout the whole of the mass, and inconvenience has often been experienced from the ignition of the phosphorus during the process of mixing. Doubts have also been entertained whether the phosphorus paste, after being prepared for use, is not liable to undergo spontaneous ignition, especially in warm weather, in which case its use would be attended with considerable danger. With the view of ascertaining the best process for preparing the paste, and of determining the temperature at which its ignition takes place, a few experiments were made, of which we give the results.

For the preparation of the *Phosphorus paste*, the following process was found to be unexceptionable:—

Introduce one drachm of phosphorus into a Florence flask, and pour over it one ounce of rectified spirit. Immerse the flask in hot water until the phosphorus has melted, then put a well-fitting cork into the mouth of the flask, and shake it briskly until the contents are cold. The phosphorus will now be found to be in a finely divided state, and this, after pouring off the spirit, is to be mixed in a mortar with an ounce and a half of lard. The mixture takes place unaccompanied by combustion, nor does the retention of a small portion of spirit by the phosphorus interfere with this result. Five ounces of flour and an ounce and a half of brown sugar, previously mixed together, are now to be added, and the whole made into a paste with a little water.

Cheese may be substituted for sugar when the paste is intended for rats or mice.

Some of the paste, prepared as above, was made into little pellets, and these were laid on an iron plate over a furnace. It was found that ignition did not take place until the iron plate had become hot enough to burn the finger, and even then the pellet burned with a very feeble flame, and failed to communicate the combustion to a piece of paper placed beneath it. Similar results were obtained on repeating the experiment several times.

Some of the paste was prepared with double the above quantity of phosphorus, and the only difference observed in the results was, that the ignition took place at rather a lower temperature (but still a temperature too hot for the finger), and that when ignited it burned rather more briskly.

POISONING BY ACONITE (GLASGOW).

On Saturday, January 8, one of the most afflicting cases possible of accidental poisoning occurred in our city. Mr. Brown, of the well known firm of Brown and Love, felt himself slightly unwell, and called at one of the oldest and most respectable medical establishments in our city, where a medical student, a friend of his own, was attending, to acquire a knowledge of medicines, with a view to his profession. It seems to be the practice that, before medical students obtain licence, they are sent to some respectable medical establishment to obtain a practical knowledge of medicines. The student's name was Whitely, who had attended medical classes in our city for a period of two or three years, and had been in the medical establishment some seven months. Students in this position are not understood to have any right to prescribe or even give out medicines, but merely to be present to obtain information regarding the making up of recipes, &c. The Druggist himself had gone to dinner on Saturday evening, but had left a young man in his place, who was present when Whitely prepared the dose for Mr. Brown, but paid no attention to what was going on, as Whitely and Brown were on intimate terms of friendship. Whitely prepared for his friend a dose of tincture of aconite, and gave him twenty-five drops—the usual dose being from five to eight drops. Shortly after receiving the draught he felt its effects and went away, but returned in about an hour after, when the Druggist was in the shop. The Druggist observed evidence of approaching paralysis, and other effects of the poison, and immediately got a cab, and sent him to Dr. Laurie, who prescribed for him; but did not apprehend any immediate danger. Mr. Brown, however, became worse, and died at ten o'clock. The British Pharmacopœia differs from others as to the strength of the tincture of aconite. The student Whitely had read, in some French book, that twenty-five drops were a dose; but there are several distinct tinctures of aconite, of which the British is the strongest. The student thus gave the French quantity of the stronger tincture—a dose sufficient to kill two men. It is a powerful sedative, and without pain, poisons the vitals and stops the functions of life. Whitely is out on £50 bail, and medical men are inquiring how far the student is excusable in prescribing at all, and especially in prescribing a British preparation according to French law.—*Glasgow Examiner, Jan. 15th*, 1853.

[*The Glasgow Examiner*, from which the above report is condensed, contains severe remarks on the "recklessness and presumption" of Dispensing powerful medicines without possessing the proper qualification. Precautions are suggested respecting the arrangement of the drugs in Chemists' shops, the safe custody of poisons under lock and key, and the conditions under which access to the poison closet should be permitted. The question, who is to blame? is considered, and, as usual, the mischief being done, the mode by which it might have been prevented is pointed out, and the parties concerned are denounced, as if they had intentionally, or from the most culpable negligence violated the rules of common prudence. Severe animadversion is made on the deficiency of education among assistants and others engaged in Dispensing poisonous drugs, and the necessity for legislative interference is insisted on.

While we cannot but regret the imprudence of Mr. Whiteley in taking on himself the responsibility of administering so powerful a medicine, this does not appear to us to be an ordinary case of culpable ignorance. He had been for several years a medical student, and for seven months acquiring a knowledge of Pharmacy in a good house of business. An erroneous impression existed in his mind as to the dose of the tincture, and unfortunately he acted on this impression. The existence of several tinctures, having the same name but differing in strength, is much to be regretted, and from this cause accidents have frequently occurred in the hands of highly qualified Medical practitioners. Instead of being surprised at the occurrence, we are astonished at the small number of fatal accidents which have taken place with this tincture, to which we have on several occasions directed attention by way of precaution. In the eighth volume of this Journal, page 153, under the head "Random prescribing," the following remarks occur:—

"With respect to tincture of aconite, how is this to be prepared? In another part of this number we have given several tinctures of aconite. The dose of the mildest of those tinctures would be about thirty or forty drops, of the strongest a drop or two—the maximum dose five drops. The employment of one of the strongest formulæ, when the mildest was intended, might produce almost instant death: and who is to be responsible? The prescription may be brought to one Chemist to be prepared, and he may send to another Chemist for the tincture. The patient dies—who is to blame? We strongly recommend every Chemist when a prescription is brought to him in which tincture of aconite is ordered without directions as to its strength, to pause before he prepares it. A coroner's inquest is a very serious matter."

Since the publication of the above caution (October, 1847), a new London Pharmacopœia has appeared, in which a tincture of aconite is introduced, and this happens to be one of the strongest formulæ. The dose is from one to five drops. We have known rather alarming effects to be produced from a dose of eight drops, and ten or twelve might in some instances prove fatal. We take this opportunity of observing that the discrepancy between the strength of certain preparations in the London Pharmacopœia, and those having the same name in the Pharmacopœia of the Edinburgh College, is sufficient to produce serious results, if substituted for each other. Under these circumstances some indulgence is due to a young man who, having a sound general knowledge of his profession, has the misfortune in a case like the one before us to act upon an erroneous impression as to the dose.

We quite agree with the Editor of the *Glasgow Examiner* in his opinion of the necessity for legislative interference in ensuring the efficient education of dispensers of medicine, and recommend him to take under his tuition those Members of the College of Surgeons, Edinburgh, and the Faculty of Physicians and Surgeons, Glasgow, who came to London last year for the express purpose of obstructing the passing of an Act for regulating the qualifications of Pharmaceutical Chemists, which Act notwithstanding this opposition was passed, although with considerable mutilation.—Ed. Pharm. Journ.]

ACCIDENTAL SUBSTITUTION OF EXTRACT OF BELLADONNA FOR EXTRACT OF DANDELION.

Prosecution of the Manufacturer.

The *New York Journal of Pharmacy*, for November, contains the report of a trial—Samuel Thomas, jun., and Mary Ann Thomas his wife, against Hosea Winchester—in the Court of Appeals. Ruggles, *chief judge*. It appears that the so-called extract of dandelion was manufactured for the defendant by A. Gilbert, whose name appeared on the label, but that by some error in putting up the article, a jar of extract of belladonna was inadvertently substituted for one of dandelion. The defendant sold it to Jas. S. Aspinwall, Druggist, New York, who in turn sold it to Dr. Foord, a Physician and Druggist of Cazenovia, Madison county, who furnished it to plaintiff for his wife, on the prescription of her Physician.

"The defendant, on the trial, insisted that Aspinwall and Foord were guilty of negligence in selling the article in question, for what it was represented to be in the label; and that the suit, if it could be sustained at all, should have been brought against Foord. The judge charged the jury that if they, or either of them, were guilty of negligence in selling the *belladonna* for *dandelion*. the verdict must be for defendant, and left the question of their negligence to the jury, who found on that point for the plaintiff. If the case really depended on the point thus raised, the question was properly left to the jury. But I think it did not. The defendant, by affixing the label to the jar, represented its contents to be *dandelion*, and to have been *prepared* by his agent, Gilbert. The word *prepared* on the label must be understood to mean that the article was manufactured by him, or that it had passed through some process under his hand, which would give him personal knowledge of its true name and quality. Whether Foord was justified in selling the article upon the faith of the defendant's label, would have been an open question in an action of the plaintiff's against him; and I wish to be understood as giving no opinion on that point. But it seems to me to be clear, that the defendant cannot in this case set up as a defence that Foord sold the contents of the jar as and for what the defendant represented it to be. The label conveyed the idea distinctly to Foord that the contents of the jar was the extract of *dandelion*, and that the defendant knew it to be such. So far as the defendant is concerned, Foord was under no obligation to test the truth of the representation. The charge of the judge in submitting to the jury the question in relation to the negligence of Foord and Aspinwall, cannot be complained of by the defendant.—Judgment affirmed.

H. R. Seldin, *State Reporter*."

The original verdict against Winchester was 800 doll., the cost of appeal, &c., swelled the amount to near 1400 doll., which was paid by Winchester.

ON THE ADAPTATION OF LITERARY AND SCIENTIFIC INSTITUTIONS TO PHARMACEUTICAL EDUCATION.

[We have received the following communication from a correspondent, together with a copy of the rules and bye-laws of a literary institution at Modbury, and a catalogue of books in the library.]

On reading your remarks headed "The Lectures at the School of Pharmacy," Mr. Scholefield's communication, "Pharmaceutical Education, Means to the End," and the observations of "Juvenis" in the December number of the Pharmaceutical Journal, the idea occurred, that probably the difficulties of each case, and also with regard to the publication of lectures, might, to a certain extent, be overcome, by organizing a systematic plan of *class teaching* throughout the country. It is a well known fact, that in almost every town there exists a "Mutual Improvement Society," "Literary and Scientific," or "Mechanics' Institution,"—225 of which, numbering 90,000 members, have recently joined themselves in union with the Society of Arts, London.

Would it not be desirable that in remote districts, where no Philosophical Society exists, for the express instruction of young men in the various branches more intimately connected with the routine of a Pharmaceutical education, advantage

should be taken of the opportunity afforded by the above-named Societies, and every inducement held out in urging our youth to become Members, and form *classes* for the study of Languages, Botany, Chemistry, and the various branches of Natural Philosophy, according to time and requirements. Very many of these institutions are already supplied to a certain extent with chemical and philosophical apparatus; and it only requires combination and "willing private instructors in the principals of the present day for the purpose in view."

This is not expecting too much of those who have the cause of education at heart; and I am of opinion with Mr. Scholefield, "there are few towns where some one would not be found gratuitously, or for a trifling remuneration, competent" to the above undertaking, "which I think would be eagerly sought after and supported;" more especially as "the Council of the Society of Arts are engaged in endeavours to procure from men of eminence, *MS. lectures* which may be circulated among the associated institutions, to *organize a system of class teaching, and to provide a collection of diagrams, models, &c., for illustrations.*" Though these may not treat directly of Pharmacy or Materia Medica, yet they would embrace Chemistry and other branches of physical science, thus indirectly supplying an invaluable amount of information bearing upon the above subjects. With the many excellent treatises on Chemistry, Pharmacy, and Materia Medica, already in existence, and the aid offered through the associated institutions by the Society of Arts, it is to be hoped Members of the Pharmaceutical Society, many of whom are highly competent to the task, will take the lead, selecting from among themselves those best qualified as tutors, and preside over classes of Associates, Apprentices, and others, for mutual instruction.

The early closing of shops in most towns is an additional reason for devoting a portion of the time rescued from business to study, and where can it be more profitably turned to account than in the class room?

"All branches of science are so intimately connected, that a *composed institution* might be maintained by uniting several societies, and arranging the meetings so as to accommodate each in its turn."

The above suggestions are not intended to depreciate the value of lectures, on the contrary, those students most diligent in a class will be found best able to appreciate lectures of professors, whether delivered orally or read from a report.

IMPROVEMENTS IN THE MANUFACTURE OF MANURE.

(*Stothert's Patent, enrolled Oct.* 17.)

The first part of the patentee's invention has reference to the treatment of sewage water, and is thus effected: the sewage water being received into suitable tanks, is kept constantly agitated, with the addition from time to time of recently burnt quicklime, as new quantities of sewage are run into the tanks. 10½ lbs. of sulphate of alumina, ½ lb. of sulphate of zinc, and 10½ lbs. of compound animal and vegetable charcoal are then added to each 1000 gallons of sewage water, a portion of which is by this means precipitated in a solid form. The supernatant fluid and the solid precipitate may both be used for manure. The former may be applied in the manner usually directed for liquid manure, and if intended to be kept for any time, one drop of creosote or oil of peat may be added to each gallon of fluid. The solid manure may be at once dried and formed into blocks, or it may be first mixed with refuse vegetable or mineral substances. The compound animal and vegetable charcoal used is obtained by the destructive distillation of night-soil on the precipitated material above mentioned, with peat or refuse tanner's bark.

The other part of the patentee's invention relates to the manufacture of manure with urine. For this purpose the patentee adds a sufficient quantity of sulphate of alumina to putrid urine to effect its neutralization; he then evaporates the mixture to a pasty consistence and mixes it with peat or spent tanner's bark.

IMPROVEMENTS IN THE PRESERVATION OF WOOD AND METALS FROM DECAY.

(*Machabee's Patent, enrolled Dec.* 8.)

The composition specified in this patent is formed by melting together 3½ parts of vegetable tar, one part of mineral tar, one-sixth part of resin turpentine of Pinus

Larix, one-third part of wax, one-sixth part of white grease, with or without the addition of one-third part of Roman cement, and a similar quantity of hydraulic lime in fine and sifted powder. The mineral ingredients are added to the others when in a boiling state, but are only required in those cases in which the material to be coated with the composition or mastic is to be exposed to the action of heat. The composition is applicable to wood, metal, brickwork, &c., the surfaces of which must be well cleaned prior to its application, which may be effected by means of a brush, whilst in a heated state, and any number of coats may be employed. When the composition is used for covering the inner surfaces of walls, a coating of plaster is applied over the mastic.

IMPROVEMENTS IN DRESSING LEATHER.

(*Tanner's Patent, enrolled Jan.* 6.)

The improved process of dressing leather, specified in this patent, consists of the combination of blubber and cod-liver oil. The blubber is first melted at a temperature not exceeding 130° to 140° Fah.; an equal quantity of cod-liver oil is then added, and the mixture well stirred. This preparation requires to be employed at a temperature of about 70° to 80° Fah., and should be well stirred previous to use.

IMPROVEMENTS IN THE MANUFACTURE OF PLASTIC COMPOSITIONS.

(*Gaullie's Patent, enrolled Jan.* 6.)

To manufacture this improved plastic composition, equal parts of gutta percha and Roman cement reduced to the consistence of a paste, by means of ox-gall, are intimately mixed together, the gutta percha being previously reduced to a plastic state by heat. To the composition thus obtained, any colouring ingredient may be added for the purpose of ornamentation. The patentee is a Parisian sculptor.

IMPROVEMENTS IN BLEACHING AND SCOURING WOVEN AND TEXTILE FABRICS AND YARNS.

(*Higgin's Patent, enrolled Dec.* 24.)

The improvements consist in the combination of a mixture of soda, ash, or caustic soda, with a resinous substance and lime, and using the same for boiling cloth and yarn therein, intended to be bleached and scoured.

CHEMICAL DISINFECTANTS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In the paper on Disinfectants, published in the Pharmaceutical Journal for last December, I have stated that it has been suggested that ozone is an oxide of nitrogen (vol. xii., No. vi., p. 282). Will you kindly allow me sufficient space to mention, that the suggestion did not originate with me; the conclusions I had in view were those of Mr. Stevenson Macadam, my Assistant, who was led two years ago to the belief, that ozone is an oxide of nitrogen, and in all probability, identical with nitric acid.

Mr. Macadam intends to publish his views when his Researches on Ozone are completed, but in the meanwhile having mentioned one part of them, I think it right to connect them with the name of their author.

Yours very truly,

24, *Brown Square, Edinburgh, Jan.* 11*th*, 1853. George Wilson, M.D.

ROYAL INSTITUTION.

The Friday Evening Meetings commenced on the 21st of January, and a crowded audience assembled on the occasion, in anticipation of a discourse by Faraday on Magnetism. The communication related principally to some recent investigations of the influence of distance from the source of power on the intensity of the magnetic force. It has hitherto been assumed that a similar law exists with regard to magnetism as that which has long been established with regard to gravity. Experiments, however, which Faraday has recently made with a very powerful permanent magnet and a delicate torsion balance, have led him to a different conclusion. It would appear, that hitherto the influence of the atmosphere surrounding the bodies on which observations have been made, has not been sufficiently taken into account, and that when this is compensated for, the diminution of the force with increase of distance, is not so great as has been thought.

Reference was also made to the supposed connexion of the magnetism of the earth with that of the sun, the remarkable coincidence of the greatest variations in the magnetic needle occurring when the spots on the sun were most abundant, being adduced as evidence in support of such connexion.

CHEMICAL SOCIETY, DUBLIN.

We have received a prospectus and copy of an address from the Secretaries of this newly-formed Society, and an abstract of a lecture by C. A. Cameron, Esq., one of its professors, on the Chemical Constitution of Cod-liver Oil. We regret that our space does not admit of the insertion of these documents, but we are glad of the opportunity of announcing the establishment of a Society having for its object the cultivation and advancement of the science of Chemistry in the sister kingdom.

BOOKS RECEIVED.

The Literary and Scientific Register and Almanack for 1853. By J. W. G. Guteh, M.R.C.S.L., F.L.S., &c. London: David Bogue, 86, Fleet Street.

This annual Pocket-Book sustains its reputation as a useful compendium of Literature and Science. The article on Physiology has been entirely re-written, and the articles on Astronomy and Chemistry have been carefully revised, bringing them down to the present day, giving about twenty new pages of matter.

A Manual of the Nervous Diseases of Man. By Moritz Heinrich Romberg, M.D., &c. &c. Translated and Edited by Edward H. Sieveking, M.D., &c., vol. i. London: Printed for the Sydenham Society, 1853.

The Half-Yearly Abstract of the Medical Sciences. Edited by W. H. Ranking, M.D., Cantab., and C. B. Radcliffe, M.D., London. Vol. xvi. July-December, 1852. London: John Churchill, Princes Street, Soho; Edinburgh: Maclachlan and Co.; Dublin: Fannin and Co. 1853.

On the Resources of King's College, London, for Medical Education; *being the Lecture delivered at the opening of the Medical Classes in that Institution, on the* 1*st of October*, 1852. By Robert Bentley Todd, M.D., F.R.S., &c. &c London: John W. Parker and Son, West Strand. 1852.

A Letter addressed to James Syme, Esq., Professor of Clinical Surgery, Edinburgh; *in Refutation of certain Statements made by him and others, in relation to a Case of Stricture of the Urethra.* By Francis Burdett Courtenay, M.R.C.S.E. London: Published by the Author. 1852.

A Treatise on Auscultation and Percussion. By Dr. Joseph Skoda. Translated from the fourth edition. By W. O. Markham, M.D., Assistant Physician to St. Mary's Hospital. London: Highley and Son, Fleet Street. 1853.

TO CORRESPONDENTS.

The Extraordinary Allegation.—While our last number was in the press, we received the report of the final adjudication of this case, but too late for insertion. To complete our report, we have now to state that the opinions we expressed last month were confirmed.—Dr. Taylor and other witnesses were examined, and entirely repudiated the charge which had been made against Mr. Messer, who was not called upon to make a defence, as the case entirely broke down. The woman who brought the charge is supposed to be of unsound mind, and if the Alderman had made due inquiry before granting the summons, he would not have been imposed upon.

J. R. (Spilsby).—Marking-ink without preparation. See vol. vi., p. 419, and vol. vii., p. 182.

"*Diogenes*" (Bath).—(1.) See p. 361.—(2.) See our last number, p. 315.—(3.) Quinine dentifrice, the proportion of quinine generally used is four or five grains to the ounce.

C. J. F. (Pimlico).—Ceratum Calaminæ is commonly called "Turner's Cerate;" if prepared according to the Pharmacopœia it is of a pale brown colour, but it is often met with in commerce much darker.

J. G.—The attendance of lectures previous to the examination is not absolutely necessary, but of great service.

J. P.—This question has been repeatedly answered. See page 315 of the January number.

E. R. (Cromer Street).—Red gelatine is probably coloured with cochineal.

Chemicus (Leominster).—Bowman's *Introduction to Chemistry*, 6*s.* 6*d* ; or Griffin's *Chemical Recreations*, 7*s.* 6*d.*

Angustura.—See page 314 of the January number.

S. H. (Derby) inquires, who should bear the expense of the education of an apprentice, the master or the youth himself? [The master undertakes to teach him his business and should provide such means of instruction as are necessary. A few Chemical experiments, conducted judiciously, on a small scale, would be attended with very little expense. The apprentice, on his part, undertakes not to *waste* his master's goods.]

"*Sagapenum.*"—(1.) Only the annual subscription.—(2.) See No. 6 of this vol., p. 261. It would be advisable to come up for examination before May.

A. Z. (Wellington) will find his question fully answered in the 1st, 2nd, 3rd, 4th, 5th, and 7th numbers of this volume. If he will not take the trouble to read what is published, it would be useless for us to repeat it.

An Assistant (Manchester) having been connected with the business for ten years, and having been a registered apprentice, complains at the obligation to pass an examination. He must have known when he became a registered apprentice that this would be the case. The Charter requires it, and the Act confirms the Charter. See No. 6 of this vol., p. 261. The Apothecaries Act did not exempt assistants.

"*Celsus*" (Nottingham).—See No. 6 of this vol., page 261. The certificates referred to can only be received on behalf of those who were in business on their own account before the date of the Pharmacy Act.

R. C. (Devizes).—Iodide of potassium is administered in much larger doses than it was at thetime of its introduction. There is, therefore, a wide range between the minimum and maximum doses quoted.

Chemicus (Newbury).—Iodide, and proto-iodide of mercury, are synonymous terms. When made according to the formula in the last Pharmacopœia, it is of a greenish-yellow colour. When sublimed it is yellow. The name proto-iodide of mercury as applied to this preparation, is founded upon the adoption of 200 or 202 as the equivalent of mercury. In Fownes's *Manual*, the equivalent of mercury is taken at 100, and consequently the names applied to the different compounds are different from those of our Pharmacopœia.

R. A. R.—Chlorate of soda is a salt corresponding with chlorate or oxymuriate of potash.

Erratum.—At page 360 of our last number, *for* Chinoidine, *read* Chinidine.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XII.—No. IX.—MARCH 1st, 1853.

MEMOIR OF THE LIFE OF THE LATE JONATHAN PEREIRA, M.D., F.R.S., F.L.S.,

Fellow of the Royal College of Physicians, London; Vice-President of the Royal Medical and Chirurgical Society; Honorary Member of the Pharmaceutical Societies of Great Britain, St. Petersburgh, and Portugal; of the Medical and Physical Society of Erlangen, and of the Natural History Association of Hesse; Corresponding Member of the Society of Pharmacy of Paris; Examiner in Materia Medica and Pharmacy to the University of London; Physician to the London Hospital, &c. &c.

The decease of a Physician, whose talent and assiduity have raised him to eminence, is under any circumstances felt by his patients and friends to be a severe calamity. This is especially the case when the event occurs with little or no warning, in the prime of life, during the full enjoyment of the mental faculties and bodily energy, and in the midst of researches and professional avocations calculated to advance science and benefit mankind.

It is not merely in his capacity as a Physician that the memory of Dr. Pereira claims our respect, and that his early removal from the scene of his labours is a source of regret and disappointment. So much of his attention had been directed to that branch of science which constitutes the link between Pharmacy and the practice of medicine—namely, the study and classification of the agents employed in the treatment of disease—that his researches were valuable alike to the Pharmaceutist and to the Medical Practitioner. He was an authority to whom both appealed with confidence in cases of doubt, and from whom the entire profession derived an important accession to the store of scientific and practical knowledge in the department in which he stood pre-eminent.

Although medical practice was his ultimate object, he was much engaged (especially during the early part of his career) in teaching Chemistry and Materia Medica; and, of late years, whilst rising in fame and popularity as a Physician, he was conferring on the Pharmaceutical Society the benefit of his experience and practical knowledge as its Professor of Materia Medica. In this latter capacity he became so much identified with the progress of Pharmaceutical education in this country, and his services were of so much importance to the Society, that a memoir of his life, with an account of his progress in his professional career, is due to the readers of this Journal.

Jonathan Pereira was born on the 22nd of May, 1804, in the parish of Shoreditch, London. At about ten years of age he was placed in a classical academy in Queen Street, Finsbury, where he remained about four years; he there made the best use of the advantages he enjoyed, and was considered one of the most promising pupils in the school. His preliminary education, however, was not in accordance with the position he was destined to occupy in after life; his father, who was a London merchant and an underwriter at Lloyd's, being, at that time, reduced from affluence to comparatively straitened circumstances, owing to some unfortunate speculations in which he had embarked.

Pereira was removed from school at the early age of fifteen and articled to Mr. Latham, a Navy Surgeon, then in general practice in the City Road. Before the expiration of three years this gentleman became the subject of mental derangement, and the indentures of his pupil were cancelled. During this short period of his apprenticeship the young student was indefatigable in the pursuit of his classical studies, and drew up a vocabulary of the terms commonly employed in medical literature.

In 1821 he became a student at the Aldersgate General Dispensary, and attended the lectures of Dr. Clutterbuck on Chemistry, Materia Medica, and the Practice of Medicine, Dr. Birkbeck on Natural Philosophy, and Dr. Lambe on Botany. He was likewise a pupil at St. Bartholomew's Hospital, where he entered to the Surgical practice. Early in 1823 a vacancy occurred in the office

of Apothecary at the Aldersgate Street Dispensary, for which he was strongly advised by Dr. Clutterbuck and other medical friends to become a candidate. The licence of the Society of Apothecaries, however, being an essential qualification, he applied himself assiduously to the task of preparing for the examination, which he passed on the 6th of March, 1823, in the nineteenth year of his age, and immediately commenced an active canvass for the post he desired to obtain. He was strongly supported by the medical officers of the Institution, and was ultimately elected without opposition.

He had not long been Apothecary at the General Dispensary before he established a class of pupils, to whom he gave private instruction preparatory to their examination. This undertaking was attended with eminent success, and afforded an opportunity for the development of his talents as a teacher. In furtherance of his object he published several works for the use of students, namely, a Translation of the London Pharmacopœia of 1824, with a scientific description of the Preparations, their re-actions and decompositions; *Selecta e Præscriptis*, a small work which we have occasion frequently to recommend to our juvenile readers, the eleventh edition of which appeared in 1851; *A Manual for the use of Students*, which was afterwards (by permission) adopted and edited by Dr. Steggall; and *A general Table of Atomic Numbers, with an Introduction to the Atomic Theory*. These works laid the foundation of his reputation as a teacher, and evinced his aptitude for scientific research.

On the 3d of June, 1825, he became a Member of the College of Surgeons, and in 1826 he succeeded Dr. Clutterbuck as lecturer on Chemistry at the Aldersgate Street Dispensary. His first lecture was devoted to an account of the rise and progress of Chemistry from the earliest date to which the history of the science could be traced, and comprised a notice of the latest discoveries. The theatre was crowded to excess, and the lecture created no little sensation from the profusion of illustrations, the amount of information, and the style of his delivery. Among other illustrations he exhibited bromine, which had recently been discovered by Balard, of Montpellier.

In the course of his scientific researches in Materia Medica he had occasion to consult French and German authors, and accordingly he engaged tutors to instruct him in these languages. In the course of about two years from this time he had become familiar with all the important facts then known connected with the subject of Materia Medica, and had made some progress in classifying and arranging these facts on scientific principles, intending to embody the result of his labours in a comprehensive and voluminous work. To this task he applied himself with great industry, rising at six in the morning and generally devoting about sixteen hours a-day to his studies. He had a retentive memory, and made a practice of noting down all the facts which he collected together, with references to the authors or other authorities from which the information was derived.

In this manner he accumulated the materials for his great work, *The Elements of Materia Medica*, which so completely engrossed his attention that for several years after 1827 he did not appear before the public as an author. In 1828, however, he commenced a course of lectures on Materia Medica at the Dispensary, and his class soon became the largest in London, his merits as a teacher being fully appreciated by his pupils. For several years he continued from time to time to revise and rewrite his lectures, adding such fresh facts or improvements as came under his notice; and thus advancing at the same time his forthcoming work, of which the lectures were the foundation.

Early in the year 1832 he resigned the office of Apothecary to the Dispensary, and on this occasion a silver salver was presented to him by the Governors of that Institution, as a memento of their regard and esteem. In the following September he married, and established himself in general practice in Aldersgate Street.

In the winter of 1832 he became Professor of Materia Medica in the New

Medical School in Aldersgate Street; and at the same period succeeded Dr. Gordon as Lecturer on Chemistry at the London Hospital. During the time that he was lecturing at the Aldersgate School, Dr. Cummin, who was the Lecturer on Forensic Medicine, and also Editor of the *Medical Gazette*, induced him to consent to the publication of his lectures in that Journal. At the time this arrangement was made, *The Elements of Materia Medica* had recently been commenced, and a small portion was already printed, which the author made up his mind to sacrifice, as he thought the publication of his lectures in the first instance in the *Medical Gazette* would facilitate the completion of his labours, and pave the way for the more complete work. The lectures appeared in the *Medical Gazette* in the years 1835-6-7, and they contributed greatly to raise his reputation abroad as well as in this country.

His class at the Aldersgate School became so numerous that he deemed it expedient to build a new theatre, which he did at an expense of about £700. His income from lecturing amounted at that time to upwards of £1000 per annum, and some of his friends advised him to pause before sacrificing so large a proportion of a year's income in a building in which he had no permanent interest, and for which he could not expect to be reimbursed in the event of his retiring from his office. But he was not to be diverted from his purpose. It was his custom throughout life, when engaged in any important undertaking in which he felt a deep interest, to throw aside minor considerations, and never to be swayed by mercenary feelings in the prosecution of the great object before him. Accordingly he completed the theatre. Shortly afterwards he was solicited by some of the authorities of St. Bartholomew's Hospital to join their school as Professor of Chemistry and Materia Medica. To this he assented, and prepared a syllabus of his intended lectures, which was published, and the necessary arrangements were completed. It was, however, intimated to him that, according to the bye-laws of the hospital, it was necessary that he should, on becoming professor, relinquish his professorships in other institutions. This he declined to do; upon which the governors of St. Bartholomew's Hospital were summoned to consider the subject, with a view of suspending the bye-law in that instance in order to secure so desirable an addition to their staff. Some discussion arose in the medical journals, in which the relaxation of the law was advocated in the *Medical Gazette*, while the editor of the *Lancet* took an opposite view of the case, and represented it as an act of favouritism to a rising professor. It was ultimately decided that the bye-law could not be entirely suspended, although some modification of it was agreed to, which, however, was not satisfactory to Mr. Pereira, who declined to relinquish his position as lecturer at the London Hospital, and abandoned his intention of embarking in the new office. He nevertheless left the Aldersgate School about a year afterwards.

In the appearance of the lectures on Materia Medica in the *Medical Gazette* increased the popularity of the author, and the anxiety of Messrs. Longman, his publishers, to launch the *Elements*, the first volume of which appeared in 1839, and the entire edition was sold before the appearance of the second volume in 1840. The second edition of the work was published in 1842.

The year 1840 he made arrangements for leaving London for two years, for the purpose of graduating in one of the universities in Scotland, when, unexpectedly, the prospect of a vacancy in the office of Assistant-Physician to the London Hospital, presented itself. This was a position to which he had for some years aspired, although he did not anticipate that so early an opening would have occurred. In order to become a candidate it was necessary that he should be a licentiate of the College of Physicians, and an examination was about to take place in a week or ten days from the time that the prospect of a vacancy at the Hospital was made known. No time was to be lost: he waited on the President of the College, Sir Henry Halford, to ascertain the latest day on which he could be allowed to present himself, and an indulgence of two or three days was granted. He applied himself assiduously to the task of pre-

paring for the examination, and laboured day and night in refreshing his memory on the details of the subjects on which his qualifications were to be tested. Although his natural energy and ability supported him in this arduous undertaking, it was not without some misgivings that he presented himself for examination at the College on so short a notice; and he had the satisfaction of being congratulated afterwards on having passed with flying colours. Indeed, on his favourite subject, Materia Medica, Sir Henry Halford and the other examiners declined examining him.

His intended visit to Scotland was of necessity abandoned, and as it was not likely, in the event of his obtaining the appointment at the London Hospital, that he would be able to comply with the regulations of a British University, he applied for a degree at Erlangen, and received his diploma a few weeks after he had become a licentiate of the College of Physicians.

As soon as the vacancy at the hospital was declared he commenced his canvass, which at first was not very encouraging, and, for a short time, he entertained doubts as to the expediency of proceeding any further, but by the earnest solicitations of his friends he was induced to persevere, and eventually walked over the course on the 3d of March, 1841.

Dr. Pereira was appointed examiner in Materia Medica at the London University in the year 1839.

Most of the particulars above detailed have been published in notices in the *Lancet*, the *Medical Times and Gazette*, and other journals. We now arrive at a period in the life of Dr. Pereira during which his connection with the Pharmaceutical Society enabled us from personal knowledge to estimate the great value of his services as a Professor, and his peculiar tact and energy in scientific researches.

Early in the year 1842, prior to the opening of the School of Pharmacy at Bloomsbury Square, several Professors kindly delivered introductory lectures, with a view of promoting the undertaking, and pointing out the advantages to be anticipated from the system of education which the Society was about to introduce. On the 30th of March in that year, Dr. Pereira delivered one of these lectures, and selected for his subject "The Modern Discoveries in Materia Medica." The amount of the information comprised in this lecture, the arrangement of the subject, the completeness of the illustrations, and the style of delivery, produced a deep and lasting impression on the Members present, who made up their minds at once, that Dr. Pereira would be an invaluable acquisition to the School, and that every effort must be made to prevail on him to become one of its Professors. This, however, could not be effected immediately, as arrangements had already been completed for opening the School with three short courses of lectures, namely, on Medical Botany and Materia Medica, by Dr. A. T. Thomson; Chemistry, by Mr. Fownes; and Pharmacy, by Mr. Redwood. Although it was not deemed expedient to disturb the plans which had been made for that session, a general desire was expressed that Dr. Pereira would deliver a few evening lectures on any subject which he might think appropriate, and likely to prove interesting. Accordingly, in the months of August and September in the same year, he delivered two lectures "On the Elementary Composition of Foods." These lectures he afterwards greatly amplified, and published in the form of an octavo work of 541 pages, entitled, *A Treatise on Food and Diet*, with Observations on the Dietetical Regimen suited for Disordered States of the Digestive Organs, and an account of the Dietaries of some of the principal Metropolitan and other establishments for paupers, lunatics, criminals, children, the sick, &c.

In March, April, and August, 1843, he delivered three lectures on the Polarization of Light, and pointed out some practically useful applications of the science, as furnishing a mode of distinguishing varieties of oils, turpentines, balsams, and other substances or fluids. The changes of colour produced by the rotation of the polariscope he investigated and described, using the oxyhydrogen microscope to exhibit these phenomena. The subject was one in which the doctor took great interest, and he continued to apply the principles which he had laid down in all his subsequent pharmacological investigations to which they were applicable. In the preparation and illustration of the lectures, he spared neither labour nor expense, and published them in an enlarged form as a Treatise, which is well known and esteemed by scientific men, although the subject was too abstruse and complicated to be appreciated as it deserved, by the audience before whom the lectures were delivered.

In the year 1843 Dr. Pereira became Professor of Materia Medica to the Pharmaceutical Society, and delivered his introductory lecture in the month of September. His first course of lectures in the School of Pharmacy was numerously attended by the Members and Associates of the Society. It was the first complete course of lectures on Materia Medica addressed to Pharmaceutists which had been delivered in this country. The treatment of the subject was entirely different from that adopted at the London Hospital and other medical schools, where more than half the course is devoted to therapeutics and a detail of the medical properties of drugs, while their natural history and chemical characters are treated in a more cursory manner, as secondary in importance. Dr. Pereira knew where to draw the line, and while he did not omit therapeutics altogether, he treated of the action of medicines in general terms, giving such information as the dispenser of medicines ought to possess, without detailing the symptoms and precise circumstances requiring the administration of certain remedies. The knowledge required by the Pharmaceutist on this branch of the subject being chiefly of a precautionary nature, enough was stated to impress him with a due sense of his responsibility without tempting him to travel out of his province. On the other hand, that part of the course which related to the natural history, the commercial details, and chemical characters of the Materia Medica, was dwelt upon at greater length in a manner calculated to make an impression on the memory. Materia Medica, apart from its practical application—therapeutics—is a heavy subject, which seldom excites much interest in the mind of the student, and is generally unpopular in the medical schools; but Dr. Pereira had a peculiar tact and skill in description and illustration which invested it with a new character. From the pages of Dioscorides and Galen to the purlieus of the London Docks nothing escaped him. He would take no statement on trust if he could by possibility obtain evidence; no sample of a new or important drug, received at second or third hand, would satisfy him if he could obtain it direct from the importer, see the original package, and draw a sample himself. This was not always sufficient, for if any doubt existed as to its origin or natural history, he would not rest until he had traced the importation to its source. He had an extensive correspondence of this kind, and frequently received from correspondents in remote parts of the world interesting specimens serving to identify the genera and species of vegetable products previously involved in mystery. In these researches he was assisted by his continental friends M. Guibourt, Dr. Martius, Dr. Julius Martiny, and others, who, in turn, continually referred to him for the benefit of his experience and co-operation. The microscope was his constant companion during his examination of the products or substances which came under his notice, and he examined with equal care and accuracy their structure, chemical constitution and properties, botanical characters and physiological effects. Whatever subject was before him he threw his whole mind into it, and carefully noted down his observations and the facts which he established, with the authorities consulted, the sources of information, and other particulars.

In this manner Dr. Pereira accumulated a mass of practical knowledge, which he methodically arranged and preserved, so that it was at all times available when required. Those who were in the habit of applying to him for information on subjects relating to Materia Medica were seldom disappointed, for if he

had not the answer ready at the moment, he could almost always find a clue to it; he would take down two or three books in his library, and in a few minutes give the references chapter and verse to all that had been published on the subject. He was at all times ready to render such assistance to his friends when applied to, and, notwithstanding the pressure of his own engagements, he never appeared annoyed or impatient at the interruption. On the contrary, it seemed to be a source of gratification to him to encourage others in the pursuit of knowledge, and to inoculate them with a portion of the enthusiasm which animated himself. He was always glad to enlist fresh votaries in the cause, and to have as many investigations as possible going on simultaneously, in furtherance of which he would furnish valuable suggestions as to the mode of proceeding, and assistance in the application and arrangement of the result. No one could enjoy the privilege of associating with Dr. Pereira without feeling increased interest in these investigations, or attend his lectures without being conscious that he had introduced a new era in the branch of science which he taught. He occasionally enlivened his lectures with pithy and appropriate anecdotes, and always had a profusion of diagrams and other accessory illustrations to elucidate his subject and assist the memory. He was always ready to give further information or explanation to any student who might desire it at the close of the lecture, and took great interest in the advancement of those who were industriously disposed. In his published works he was no less distinguished for the perspicuity and minuteness of his descriptions, the number of his illustrations, and his scrupulous accuracy. Whatever he stated as a fact, might be taken for granted; and when he made statements on other grounds than his own personal knowledge, he quoted the authority. Some authors contend, that whatever has been published is public property, and that paste and scissors may be resorted to without acknowledgment; but Dr. Pereira was scrupulous in giving credit where it was due. He never gave any indication of those feelings of jealousy which unfortunately prevail too often among literary and scientific men; and although other authors sometimes affiliated and transferred to their own works the results of his laborious investigations without making reference to the authority, we have heard him allude to the circumstance with a smile, but he did not condescend to make any complaint, or to relax in his usual courtesy and friendship towards the parties who had used this freedom.

At one period of his career Dr. Pereira devoted himself chiefly to literary pursuits and his duties as professor. He had three courses of lectures in progress at the same time, and generally delivered two, sometimes three, lectures in a day. About the time of his election as Assistant-Physician to the London Hospital, his increasing practice induced him to look forward to a relaxation in his other occupations. On this account it was not without some hesitation that he accepted the office of Professor to the Pharmaceutical Society; but his desire to promote an undertaking which he considered of great importance to the Pharmaceutical body, and also to the profession in general, prevailed over other considerations, and he continued to deliver the lectures on Materia Medica at Bloomsbury Square until the session of 1851-2. In 1844 he resigned part of his course of lectures on Chemistry at the London Hospital to Dr. Letheby, and in 1846 he relinquished it altogether. In 1851 the Apothecaries' Company introduced some new regulations, making the lectures on Materia Medica a summer course, much to the inconvenience of the professors in the Medical Schools. He therefore relinquished his office as professor of Materia Medica at the hospital, continuing only the course of lectures at the Pharmaceutical Society.

In the year 1845 Dr. Pereira was elected a Fellow of the Royal College of Physicians; and almost immediately afterwards he became a member of the Pharmacopœia Committee of the College, to which we have reason to believe

he rendered important service. He was subsequently appointed Curator of the Museum, which office he held at the time of his decease. In this capacity he discovered, among the archives of the College which were under his care, some curious and interesting manuscripts relating to Materia Medica, which had been buried there for many years, and portions of which he was engaged in revising with a view to publication in the event of permission being granted by the College.

When Dr. Pereira resigned his office as Professor of Materia Medica at the London Hospital, he transferred the most important specimens of his museum (nearly 500 in number) to Bloomsbury Square, where he was at that time lecturing. These specimens, which afterwards became the property of the Pharmaceutical Society, were particularly valuable on account of the circumstances under which they had been obtained, many of them having been derived from original sources, which identified and authenticated them, others had some history attached to them, and a considerable number are the specimens figured in his *Elements of Materia Medica*. Although he had parted with his museum he had not ceased to prosecute his researches, and fresh acquisitions continued to come in from foreign correspondents, or other sources, in the course of his investigations. A short time before his decease he built a room for the reception of his specimens, and had filled several cabinets, the contents of which were in process of arrangement when the unfortunate accident occurred which brought his scientific labours to a close. He had been examining a substance imported under the name of isinglass (figured in the Pharmaceutical Journal for January last, page 343), and with his usual activity was about to explore the contents of the Hunterian Museum, with a view of identifying the species of fish from which it was derived. On descending a staircase leading to the museum he fell and ruptured the rectus femoris muscles of both legs, as stated in our last number. During his confinement to his bed he did not cease from his labours, but continued to correspond, and received visitors on scientific business. He was apparently recovering from the effects of the fall, and had for some days been well enough to be wheeled in an easy chair into an adjoining room, when the sudden attack occurred which terminated his life in about twenty minutes. It is supposed that the fall occasioned some internal injury which led to the fatal result. He had previously been subject to occasional attacks of palpitation of the heart, which, however, were not such as to excite alarm, although it is not improbable that a predisposition to organic lesion existed, which was accelerated by the concussion.

Among the original papers by Dr. Pereira which have appeared during his connection with the Pharmaceutical Society, we may enumerate the following, some of which were read at meetings of the Society, and others published among the original articles in the Pharmaceutical Journal:—

Varieties of Hyoscyamus; The Fruits of Hemlock, Anise, and Fools' Parsley; The Ceylon Cardamom; Grains of Paradise; Chinese Galls; Summer Plant Winter-Worm (a Chinese medicine); Potato Starch; On the Formation of Scientific Committees for the Advancement of Pharmacology; The Adulteration of Scammony; Some rare kinds of Rhubarb; Samovy Isinglass; The Circular Polarization of several Terabinthinate Substances; Chloride of Formyle, or Terchloride of Carbon; Banbury Rhubarb; Alcornoque Bark; The Fruit of Amomum Melegaette; The Cardamom of Abyssinia; Microscopic Vegetations developed in Pharmaceutical Liquids (four papers); Notices of several Drugs from St. Petersburgh; The light and heavy Varieties of Carbonated and Calcined Magnesia; Prepared Chalk and precipitated Carbonate of Lime (two); Liquor Acidi Arseniosi Hydrochlorici; Cod-Liver Oil; The Colouring Matter of Dutch Cake Litmus (two); The Commercial Varieties of Ginger; The Commercial Varieties of Turmeric; Amomum Citratum, an undescribed Cardamom; The Alcohol Test for the Purity of Castor and Croton Oils; Kosso; Hyraceum; Myrospermum Pubescens, Myrospermum of Sonsonate; Nag-Kassar; Calysaccium Longifolium; Kokum Butter; The presence of Hydruret of Salicyle in Aqua Castorei; Black Balsam of Peru; Mishmee Bitter, or Coptis Teeta; Decomposition of Chloroform; Socotrine Aloe Juice, &c.

In addition to the above he contributed to this Journal many articles, and notes to others, which by his desire were inserted without acknowledgment. He revised the more important scientific papers, and was at all times ready to give his advice and assistance, the value of which could not be too highly estimated. It appeared to be his desire to keep as much as possible in the background, while he voluntarily performed a considerable share of work for which he took no credit, and often gave for publication notices on various subjects prepared for a future edition of his work on Materia Medica, in which he afterwards published them as quotations, although originally derived from himself. It was only in compliance with his request that we have hitherto abstained from acknowledging these obligations; but it is right that the fact should be known, as his lamented decease has removed the restraint, and enabled us to do justice to the kindness and liberality of his disposition.

It will be acknowledged by all those who were acquainted with Dr. Pereira and his works, that he stood alone as the most indefatigable and pains-taking labourer, and the highest authority, in the department of science in which he chiefly distinguished himself. He loved science for its own sake, and the stimulus which animated him was not so much the acquisition of fame, as the pleasure he derived from the investigation of scientific phenomena, and the establishment of truth. He was no less devoted to Chemistry than Materia Medica. At the same time he did not allow these pursuits to interfere with his duties at the London Hospital, and his other professional engagements, and he had an extensive practice as a Physician, which was rapidly increasing at the time of his decease.

A portrait of Dr. Pereira is in process of execution, and we hope it will be ready for insertion in our number for May.

PEREIRA MEMORIAL FUND.

COMMITTEE.

Chairman—N. Ward, Esq., F.R.C.S.

Treasurers—H. Letheby, Esq., M.B., and Professor Redwood, Ph.D.

J. Adams, Esq., F.R.C.S.	J. P. Gassiot, Esq., F.R.S.
Jacob Bell, Esq.	T. B. Jeffs, Esq.
R. Bentley, Esq., M.R.C.S., F.L.S.	R. W. Jenkins, Esq.
A. Billing, Esq., M.D., F.R.S.	W. J. Little, Esq., M.D.
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F. Corner, Esq.	F. G. Goulder, Esq.
G. Critchett, Esq., F.R.C.S.	T. S. Robertson, Esq., M.D., F.R.C.S.
T. B. Curling, Esq., F.R.C.S., F.R.S.	Professor Royle, F.R.S.
A. Dale, Esq., M.R.C.S.	A. B. Rye, Esq., F.R.C.S.
H. Davies, Esq., M.D.	G. Smith, Esq.
Henry Deane, Esq.	C. B. Stuffield, Esq.
H. K. Debenham, Esq.	E. Woodward, Esq., F.R.S.
P. Fraser, Esq., M.D.	J. C. Wordsworth, Esq., M.R.C.S.

(With power to add to their number.)

At a meeting of the Committee held at the London Hospital, on the 7th of February, 1853, it was unanimously resolved:

"That a subscription be opened, and that a marble bust of the late Dr. Pereira be executed and placed in the New College of the London Hospital; and that a portrait of the deceased be also executed—of which a proof copy shall be presented to each subscriber of not less than one guinea, and an ordinary copy to subscribers of half-a-guinea."

"That Dr. Letheby, of the London Hospital, and Professor Redwood, of the Pharmaceutical Society, be appointed Joint Treasurers, and that the different members of the Committee be authorised to receive subscriptions."

Nearly 100 Subscribers have already sent in their names, and a complete list will be published at a future period.

Thos. B. Christie, *Hon. Sec.*

THE ADMISSION OF MEMBERS INTO THE PHARMACEUTICAL SOCIETY.

In two months from the date of this number the privilege of admission under the new bye-laws will cease, and those who desire to avail themselves of it must make application before the 1st of May. As this regulation was intended to afford the opportunity of admission, by certificate, to all Chemists whose standing in the business entitles them to such indulgence, it is desirable and just that the fact should be universally known in order that none may have reason to complain at a future time, that they are excluded for want of due notice.

It is equally important that those to whom the new bye-laws are not applicable, and who can only be admitted on passing the examination of the Society, should be aware of the fact, that the stringency of the examination will be increased after the 1st of May. To those who aspire to the distinction of a first class certificate, and who are exerting themselves in obtaining the needful qualification, the above observation does not apply; but we refer to those young men who have not had the advantages of a scientific education, who have not the opportunity of acquiring the amount of proficiency which at a future time will be expected in all Pharmaceutical Chemists, but who nevertheless have acquired a sound practical knowledge of the trade. Those who are thus circumstanced should avail themselves of the lenient examination during the months of March and April.

From the number of communications we have lately received, and the nature of the enquiries they contain, respecting the terms and conditions of admission, we have reason to believe that the nature of the existing regulations is not so generally understood as the case requires. We therefore take this opportunity of recommending the local Secretaries in the several districts to use their endeavours to circulate information on the subject among their neighbours. The Council have not the opportunity of communicating with each individual, as a complete list of the Chemists and Druggists of the kingdom cannot be obtained. It is equally to the interest of the Society and of those who are eligible for admission that the number of Members should be increased, and that all duly qualified Chemists and Druggists should be united under the title of Pharmaceutical Chemists.

THE SUPPLY OF MEDICINES TO EMIGRANT VESSELS.

In a previous number (vol. xi., page 339) we published a list of the medicines required to be furnished to emigrant vessels, with some remarks on the regulations adopted by Her Majesty's Land and Emigration Commissioners. It will be recollected by our readers that one of these regulations requires that all medicines furnished to vessels chartered by the Commissioners shall be procured from Apothecaries' Hall.

This of course, when introduced, created much dissatisfaction among the Druggists who were in the habit of furnishing vessels with medicines, and a deputation of London Chemists and Druggists waited on the Commissioners on the

14th February, 1852, for the purpose of remonstrating and expressing a hope that they would reconsider the subject. The deputation contended that the occasional prevalence of delinquencies on the part of a few individuals was not sufficient to justify so sweeping a reflection on the whole body of Chemists and Druggists as their regulation conveyed. It was suggested that a more efficient inspection might be made, and the deputation expressed a desire to assist the Commissioners in exposing and checking the frauds which had brought the trade into disgrace. The Commissioners stated in reply that the inspection of medicines had been tried for a long time, and had totally failed. They had come to the conclusion that no course could be pursued with a prospect of success except that which they had adopted, namely, the restriction of the supply to one establishment in which they had confidence. They disclaimed any prejudice or disposition to favour any parties, and expressed regret that they had felt it to be their duty to adopt a regulation so invidious, and, in some respects, objectionable. They had a duty to perform, and being responsible for the supply of the vessels under their care with good medicines, they felt this to be the primary consideration, and unless the deputation could point out any other mode by which the object could be secured, they could not deviate from their present plan. The deputation urged that the inspection might be conducted in a more effectual manner, and a conversation of some length ensued, in which various suggestions were offered and discussed. The Commissioners, however, did not yield the point at issue, and the deputation retired under the conviction that there was little or no prospect of a change in the regulations taking place.

Soon afterwards we waited on the authorities at the Board of Trade, and ascertained that the system of inspection which was in force with regard to emigrant vessels not chartered by the Commissioners was in some respects defective, and the subject was under consideration, with a view of securing a more satisfactory result.

It was quite obvious that if sufficient grounds existed to justify the Commissioners in their restrictive policy, the same grounds were equally applicable to other vessels, and we came to the conclusion that an entire revision of the system was desirable. The efforts to bring this about having failed, and the Commissioners having declined to relax in their regulations, the subject was abandoned for the time, with the forlorn hope that some future opportunity might possibly occur of renewing it with a better prospect of success.

The subject was about the same time discussed among the Chemists at Liverpool, who also felt the annoyance and injury inflicted by the monopoly in favour of a London house. No active measures, however, were then taken, but the dissatisfaction which prevailed has continued to increase, and application was lately made to the members for Liverpool for their advice and assistance. The number of emigrant vessels which for some time past have left the port of Liverpool has been so considerable that the inconvenience of the restrictive regulation has been increasingly felt, and the parties aggrieved resolved to make an appeal to the Commissioners in the hope that some relaxation of the rule might be obtained. Accordingly, by the intervention of Mr. Turner, M.P., an interview was obtained on Thursday, the 17th of February, the report of which will be found in the Transactions of the Liverpool Chemists' Association, page 419.

This subject is one which, at first sight, appears to concern only the comparatively small number of Chemists and Druggists who are engaged in that branch of the business; but, if considered in all its bearings, it concerns the whole body of Pharmaceutists, who ought to make common cause with those whose interests are more immediately affected, and seriously to consider by what means the odium of so obnoxious a regulation could be removed. Severe and summary punishment should be inflicted on the perpetrators of the frauds which have brought this disgrace upon us all. In every case in which such delinquencies are proved to exist, no efforts should be spared to make examples of the guilty parties, and every honest man in the trade should endeavour to assist in this exposure.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

THE LATE DR. PEREIRA.

At a Meeting of the Council, held on the 2d of February, 1853, it was unanimously resolved,

That this Council desires to record its deep sense of the loss the Society has sustained in the decease of its late valued and esteemed professor Dr. Pereira, to whom the profession owes a lasting debt of gratitude for his zeal and unwearied exertions in the promotion of Science, and especially in the extension of the knowledge of Materia Medica, which he enriched with the results of his searching investigations, and imparted to the student with unrivalled facility and effect, both by oral teaching and through his published works.

The Council entertains a grateful remembrance of the valuable services which were so cordially rendered by Dr. Pereira in the promotion of the scientific and educational objects of this Institution, and which, in the infancy of the Society, contributed much to the success of its operations, both through the influence of his high character and position in the profession, and his experience as a distinguished authority in Materia Medica.

That the Conversazione announced for the 9th of February be postponed on account of the lamented decease of Dr. Pereira.

That copies of the above Resolutions be forwarded to Mrs. Pereira, with the sincere condolence and sympathy of the Council.

EVENING MEETINGS AND LECTURES.

It was resolved,

That the following regulations be adopted for the admission of Visitors to the Evening Meetings and Lectures, and to the Conversazione:—

Each Member of the Society to have the privilege of introducing a friend—the name of the visitor, and of the Member introducing him, being entered in the book in the hall. Cards may be obtained from the Secretary. Any Member desiring an additional card, may obtain the same on application to a Member of the Council.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

January 14th, 1853.

MR. T. D. WALKER IN THE CHAIR.

Mr. H. Sugden Evans delivered a lecture On the Microscope, and its increasing importance to the Pharmaceutist.

[The report of the above arrived too late for insertion in this number.]

DEPUTATION TO HER MAJESTY'S COLONIAL LAND AND EMIGRATION COMMISSIONERS.

MEMORIAL

To Her Majesty's Colonial Land and Emigration Commissioners.

Gentlemen,—We beg to represent to you, on behalf of the Liverpool Chemists' Association, by whom we are deputed, the hardship and impolicy of your order, requiring all ships chartered by you to obtain their supplies of medicines from Apothecaries' Hall. We are aware that this order has arisen out of a well-founded complaint of the quality of medicines sometimes previously supplied, but we feel

assured that your object can be attained without giving a monopoly to an establishment which has not exclusive claims to public confidence.

Your officers are at present empowered to make an examination of the supplies furnished to *all* emigration ships, and to prevent any going to sea which are not provided with a sufficient supply of good medicines, and of such sufficiency and quality they are the sole judges.

Your order assumes that this law is not always effectually carried out, but if there be a defect in that respect we think that the remedy should be applied directly to that evil, and your object would not only be attained in respect to ships chartered by you, but emigrants who have not the advantage of sailing in them would be protected. We are aware that a question has arisen whether it is possible to make an effectual inspection, but we submit that persons acquainted with their business are able to make such an examination of the medicines purchased by them as enables them to supply good articles to the public, and that a competent person, with suitable appliances, armed with your authority, could protect the interests of emigrants, even more effectually than the interests of the public are now protected.

We have been informed that the examinations now practised have been in some cases of too cursory a character, and made on board ship; but we are assured that such is not the practice in this port, and that great attention is bestowed in the matter.

In Liverpool, whence emigration takes place on so large a scale, there can be no difficulty in making the necessary arrangements; and we think the contractor should be required to send the medicines to a depôt a sufficient length of time before they are required on board the vessel, and that they should there be deliberately examined by a competent officer, who should have no communication with the tradesman supplying them. We are convinced that competition, checked by the examination of officers furnished with adequate means of examination, and applied to all classes of emigrant ships, would be more beneficial to emigrants, more economical to government, and more just to the class of tradesmen to whom we belong.

For these reasons we respectfully beg you to reconsider your regulations bearing on this subject; and we ask the favour of an interview, to enable us to give such further explanation as may satisfy you of the reasonableness of our wishes.

We are, Gentlemen, your most obedient Servants,

(Signed) R. Sumner,
P. Strawson,
John Abraham.

The Memorial having been presented to the Commissioners by Mr. Charles Turner, M.P. for Liverpool, the deputation waited on the Board on the 17th February, Dr. Edwards attending instead of Mr. Sumner, who was unable to be present.

Mr. Turner, M.P., having introduced the deputation,

Mr. Abraham said, he believed he might at once address himself to the question, whether, if the trade were open, it was possible for the inspectors to prevent bad medicines being supplied in the cases in question. It was true that it was difficult to determine by examination the exact value of some medicines, and which of two samples might be more or less pure; but in many cases there was no such difficulty; a few easily applied tests would determine at once whether they were or were not what they were called. The microscope had of late years added much to our means of examining some pharmaceutical articles. The reports in the *Lancet* of the examination of many substances in powder, such as coffee, flour, &c., he might refer to as showing how readily adulterations might be detected, powders of different kinds of grain being readily distinguishable when mixed with each other. It was possible that the sophistication of some articles might be practised so as to escape detection by their examination *per se*, but he felt certain that if the articles—upwards of 100 in number—required by the Commissioners to be supplied to every ship were placed before a competent examiner, he would readily find evidences of fraud or ignorance if such existed, and if evidence of fraud appeared in a single instance the whole should be rejected. If no evidence of fraud or ignorance appeared, the contents

of the chest might be depended on for all practical purposes. In cases where the value could not be directly ascertained, attempts to cheapen an article might be detected. In the case of most of the tinctures the principal item of cost was the spirit. A person who wished to obtain a cheaper tincture would use less spirit and more water. But this fraud might be detected most readily by the specific gravity of the liquid, and with specific gravity beads the test might be applied in a few moments. He had applied to Dr. Lancaster, one of the government inspectors at Liverpool and Vice-President of the Liverpool Medical Society, for information on the subject. Dr. L. assured him that a rigid inspection was practised, the microscope was used, tests applied, and comparison with standard specimens instituted, and that he was perfectly satisfied that the object of securing a supply of genuine medicines was attained. He was himself personally uninterested in the supply of medicines to ships, but he hoped the Board would see the propriety of relieving the trade from the monopoly and stigma of which they complained.

The Commissioners, as on the former occasion, expressed their regret at the necessity which they had felt themselves under of adopting the regulation, and their willingness to reconsider it if any other remedy equally effectual could be devised for checking the frauds which had been prevalent under the former system; but they said they had been in some degree confirmed in their opinion in favour of their present plan by the admission which they understood to have been made by the previous deputation, that no inspection which it would be practicable to carry out could ensure the good quality of every medicine in the chests. They did not see how it was possible to examine each article in every chest, and without this they did not consider that they would be secure against the introduction of impure or inferior drugs.

The Chairman of the Commissioners read a number of complaints of the quality of drugs supplied before the adoption of the existing system, and said they had been advised that inspection could not be effectual. A member of the Board observed that they had now a double security, and another member said that the Board would be willing to state in writing that they had no doubt that there were Chemists in Liverpool who would supply medicines as good as could be obtained from Apothecaries' Hall, but that it would be impossible to make a list of such, and that there was no medium between throwing open the trade and confining it to Apothecaries' Hall.

Dr. Edwards fully concurred in the opinion expressed by Mr. Abraham, that, with the present appliances of science, an efficient inspection of all the drugs could be made, within a reasonable time, by any Medical man acquainted with Pharmacy; and he referred to the examinations of drugs lately instituted in London by the College of Physicians, the *Lancet*, and the *Medical Times*, as instances of the readiness with which adulterations may be detected. He then referred to the advancement in Pharmacy, which had arisen of late years mainly through the efforts of the Pharmaceutical Society, and to the powers of registration now granted to that body; and conceived, if any restriction in the supply of medicines should be found necessary, that every object could be secured by employing only members of that body. Still his opinion was, that without any restriction in the supply, an efficient inspection was quite practicable in the hands of the present medical officers, and he strongly recommended dependence on that guarantee alone.

Mr. Strawson confirmed these remarks, and represented the large proportion of other ships satisfactorily supplied by this precaution alone, and the injustice now done to the trade by the present order.

A discussion of considerable length took place, during which the deputation were assisted by Mr. Turner. The Commissioners treated the subject with all the courtesy and attention that was possible, expressing their willingness to receive further information; and the deputation left, with the hope that the Commissioners would see reason to rescind their order.

present day of the different materials placed by nature at their disposal, it being only one hundred years since the first piece of India-rubber was brought into Europe by the traveller, La Condamine, from South America. It was only in 1845 that Dr. Montgomery laid before the Asiatic Society in London the first sample of gutta percha. India-rubber is obtained from several varieties of fig trees (principally the *Jatropha elastica*) which are found chiefly in South America, Singapore, Java, Assam, &c. To extract it from the tree, deep incisions are made in different parts of the bark during the winter season. A fluid exudes, which is received into the large leaves of the plurynium capitatum, and balls of clay are rolled in it, and these are then suspended in the air to dry. This operation is renewed until the covering has reached the thickness of about half an inch, when the clay matrix is broken and shaken out. It is ascertained that a large tree will yield from thirty pounds to forty pounds of sap, which contains sixty per cent. of solid matter, out of which from thirty-one to thirty-seven per cent. is real caoutchouc. Owing to the varieties of quality and form in which caoutchouc is imported, it becomes necessary to submit it to the following operations, to enable the manufacturer to bring it into a working condition :—The bottles or capsules of India-rubber are cut in pieces and placed in warm water for several hours, and when sufficiently swollen out, they are passed between rollers placed in contact with warm water, which transforms the pieces into leaves of two feet long and six wide. These leaves of caoutchouc are passed through a succession of rollers, and their impurities are gradually worked out; they are afterwards dried, and several of the leaves are passed between revolving cylinders, and formed into masses weighing from fourteen to twenty pounds. These lumps are gradually re-passed between two large fluted cylinders, requiring an engine of from ten to twelve horse power to move them; they then unite together and form a uniform mass of six or seven feet long, and eight or nine inches diameter. This mass is then placed in a trough and submitted to high hydraulic pressure for several days. It is from these masses that nearly all the various articles are prepared, and the greater part of them by simply placing the mass on sliding tables, which bring them in contact with circular knives revolving horizontally 8000 times per minute; these cut them into sheets of different thicknesses. For example, if a tube is required, it is simply sufficient to double the caoutchouc and cut the edges with a sharp clean instrument and the fresh surfaces will unite and form a perfect joint. To obtain threads there are generally three different methods adopted. The first consists in taking sheets of vulcanized India-rubber and cutting them by circular knives into threads of different thicknesses. The second method is by stretching a thread to six times its primitive length, passing it in that state through boiling water, and then drying it on reels and allowing it to remain there several days. A third mode has lately been published: it consists also in stretching a thread to five times its length, but in dry air, at 212°, allowing it to cool gradually, and then re-stretching it another five times its length, under the same circumstances. By this last method a strip of India-rubber, one foot in length, may be drawn by six successive stretchings into a thread of 16,625 feet long. A process has lately been discovered of manufacturing tubes, which consists in putting caoutchouc into a liquor composed of ninety-five parts of sulphuret of carbon and five parts of rectified spirit of wine. Owing to the water in this last substance, the caoutchouc only swells in the liquor, and does not dissolve. The pasty mass thus obtained is forced through plates having circular openings, and sometimes tubes are thus obtained which acquire consistency as the fluid evaporates.

The attention of the audience was then drawn to the mode by which waterproof wearing-apparel is manufactured, and which consists in passing a piece of cloth over a roller which has been dipped in a solution of caoutchouc dissolved in coal naphtha, and from which the excess adhering to its surface is removed by means of a scraper. This cloth, having taken up the caoutchouc from the roller, is made to pass between a pair of rollers, where it meets a fresh piece of cloth, and thus the caoutchouc forms a layer between the two fabrics. All that is then necessary is to steam and dry them. They can also be prepared with a mixture of caoutchouc and sulphur, which is ultimately transformed by heat into vulcanized India-rubber. During the year 1845, a Mr. Hancock discovered the first means of vulcanizing India-rubber, that is to say, combining the caoutchouc with sulphur, and thus communicating to it many valuable properties, such as a constant elasticity, and capability of resisting a moderate heat or an intense cold. After having described a

variety of modes which have been published, the lecturer said that the following was the one generally adopted :—It consists in swelling the caoutchouc in coal-naphtha, and adding to it from ten to twelve per cent. of sulphur, and triturating them perfectly, and when the whole is well mixed, it is laid between the fabrics, allowed to dry, then introduced into cylinders, and submitted to steam for an hour or more, at a temperature of 320° Fah. Another mode consists in melting sheets, &c., of caoutchouc in one vessel, and in another placed by its side sulphur heated to its boiling point, and conveying these vapours into the vessel containing the caoutchouc, by the help of a jet of steam having a temperature of 326°. The most remarkable method of vulcanizing India-rubber, was one which the lecturer intended showing, by which it was effected at the natural temperature and in a few minutes. In fact, to effect this result, it was sufficient to dip a thin slip of caoutchouc in a solution composed of 100 parts of sulphuret of carbon, and 2½ per cent. of proto-chloride of sulphur for a few minutes, then exposing it to the air, after repeating the process once or twice, the caoutchouc was vulcanized. To remove the acid it was simply necessary to give it one or two washings in weak alkali water, and then dry it. In this process and in the one above mentioned, caoutchouc combines with from ten to fifteen per cent. of sulphur. Vulcanized India-rubber had been applied to many useful purposes, and one of the most interesting was that made by Mr. W. Brockedon, in which full advantage was taken of the elasticity and contractisity of vulcanized caoutchouc. Caoutchouc has also received a valuable application under the form of marine glue, which consists in dissolving from two to four parts of caoutchouc in thirty-four parts of coal-naphtha, and mixing it with thirty-four parts of pulverized resin-lac, when the whole is heated gradually to fusion, and run into flat pieces. To apply this glue, which has proved so valuable to the navy, as to make water-tight joints with stone or wood, it is simply necessary to reduce the glue to fluid by a heat of 280°, and then apply it. There were one or two properties of caoutchouc of which it might be interesting to inform his audience. The first was, that although caoutchouc was insoluble in water, it was capable of absorbing, if kept in contact with it, from eighteen to twenty-six per cent. Another point was, that caoutchouc would gradually swell from twenty to thirty times its primitive bulk if placed in contact with coal-naphtha; and, lastly, that a mixture composed of six parts of alcohol and ninety-four of sulphuret of carbon, was found to be its best solvent; ether and turpentine only dissolved it partially; and nitric acid attacked it violently.

Mr. Crace Calvert next drew the attention of his audience to the substance called gutta percha, which, like India-rubber, is composed of carbon and hydrogen, and thus is analogous to essence of roses, turpentine, and coal-gas. Gutta percha is obtained from several species of trees, especially from the *Isonandra percha*, which grows abundantly in the island of Borneo, the fruit and flowers of which tree are used as articles of food by the natives, as well as a gum which exudes from the plant, employed by them as a substitute for butter. To obtain gutta percha the same process is followed as for India-rubber, but with this difference, that the milky fluid which runs out from the incision coagulates and dries in the air. The lumps obtained, which weigh from five to six pounds, are submitted in this country to the following process, with a view of removing the impurities which are introduced into them by the carelessness of the natives:—The lumps of gutta percha are cut into small slips by being put into contact with knives which revolve with great rapidity. These slips are worked in water by the hands; put into a conical hopper which conveys them to squeezing rollers, and thence they are brought into contact with two cylinders having small teeth, which revolve 800 times per minute. By this means the substance is cut into shreds, which swim on the cold water, the remaining impurities sinking to the bottom. Thence they are removed into water having a temperature of 180° to 200°, when they are made to unite into masses. For the gutta percha to form homogeneous masses, it is indispensable that no water should be interposed between the particles. To effect this the masses are put into a kneading machine, which consists of a box in which a cylinder is made to revolve in such a manner, that when the gutta percha is introduced into the box it is rubbed and squeezed with pressure between its sides and that of the cylinder. The lecturer here described methods of preparing tubes, &c., of this substance, and he also stated that gutta percha vessels were highly valuable, as they were not acted on by sea-water, alkalies, vegetable acids, or weak mineral acids. It was in fact only attacked

by strong sulphuric, nitric, and hydrochloric acids. It was dissolved with facility by turpentine, coal-naphtha, and chloroform; and, lastly, it had been found by experiment that the tenacity of gutta percha was as follows:—A band of six inches long, four inches wide, and $\frac{1}{16}$th of an inch thick, was capable of bearing a weight of four pounds eleven ounces.

ON THE COMPOSITION OF INSTANTANEOUS LIGHT MATCHES.

The old tinder-box, with its flint and steel and sulphur match (the origin of which cannot now be traced), stood its ground for centuries, and bid fair to be perpetual both on the score of simplicity as well as economy. The progress of science and the discoveries of modern chemistry have, however, fairly driven the tinder-box from the field, and it is now rarely seen except in the cottages of remote districts.

In 1804 a preparation of phosphorus oil and wax was introduced; this was contained in a small bottle, and into it a common sulphur match was dipped, which, when afterwards rubbed against a piece of cork, inflamed and ignited the match. Next came a preparation of phosphorus in a bottle in which a match, tipped with a composition of chlorate of potash and sulphur being dipped, became instantaneously inflamed. Next, in 1807, came the "Chemical" matches, which were formed by dipping the sulphur match in a mixture composed of chlorate of potash, sugar, gum, and vermilion, to which camphor was sometimes added; hence another designation of "camphorated" matches. These matches were placed in one department of the box, whilst the other was occupied by a small bottle containing asbestos, moistened with sulphuric acid. When the mixture is brought into immediate contact with sulphuric acid, it is decomposed with explosion and the production of fire; the sulphur, and next the wood of the match is ignited; and thus, by dipping the prepared match in the bottle of acid, an instantaneous light was readily procured. The great objection to the use of this match arose from the circumstance, that drops of the acid taken up by the match would often fall on dress, furniture, &c., and cause damage. Another objection arose from the great affinity possessed by sulphuric acid for water, so that if the bottle containing this acid remained uncorked for any length of time, the acid absorbed so much moisture from the air as to cause its dilution to a point at which it was incapable of effecting the decomposition of the chlorate of potash on the match. These matches, however, maintained their ground for a considerable period, and with a little care were very effective. In 1826 Mr. Watts, Chemist, of the Strand, brought out the "Lucifer," or light-producing match (*lux light fero*, "I bear"). These matches were composed of chlorate of potash, sulphuret of antimony, gum, &c., covering the ordinary sulphur match, and were ignited by being *drawn through* a piece of sand or glass paper. These were excellent matches, but required a little more attention in their ignition than the majority of people gave.

At the close of 1828 Mr. Jones brought out his "Promethians." These, however, were too expensive to supersede the Lucifer. The Promethians were prepared as follows:—Into a small globule of glass, no matter what shape, of the size of $\frac{1}{12}$th part of an inch to two inches long, and from $\frac{1}{24}$nd part to half an inch in diameter, there was introduced sulphuric acid, in quantity not quite sufficient to fill the globule; the aperture through which the acid was introduced was then closed by means of the blowpipe, or otherwise, so that the admission of atmospheric air and the escape of acid was prevented. The glass globule was then surrounded with a combustible material, and thus prepared, enclosed in a piece of paper, linen, or other substance capable of ignition. This combustible material was formed by mixing together chlorate of potash, sugar, camphor, &c., which, on the breakage of the glass globule by a smart blow and consequent liberation of sulphuric acid, readily took fire. The paper containing the globule of acid and the combustible composition was twisted in a spiral form, and saturated with solution of nitre or gunpowder when required for lighting cigars, &c.

In 1830 M. Derepas, of Paris, took out a patent in France for the preparation of the following composition for matches:—Into a large flask, heated in a sand-bath, put eight parts of pure phosphorus, which is allowed to be about half melted without being oxidized. Four parts of magnesia are then added, and the whole well mixed for an hour at the temperature of 234° Fah., the heat being moderated in proportion as the operation proceeds. When cooled to 100° or 106° Fah., this composition forms a kind of unctuous powder, which is put into bottles, and when cold, carefully stopped. This substance forms an opaque body, fit for inflaming a common sulphur match when dipped into it.

In 1833, phosphorus, which had for a long period been banished from the light-giving list, was again brought into use, since which time it has continued a leading ingredient in the composition of which matches are formed. The great improvements which have been from time to time introduced into the manufacture of this article, have contributed much to this result. Phosphorus is now sold at a lower price per pound than it was formerly per ounce. As late as 1837, the price of phosphorus was 42*s.* per pound, from which it has gradually fallen to 2*s.* 9*d.* per pound. In order to distinguish the new phosphorus matches from the lucifers, the term Congreves was applied to them, in allusion to Sir William Congreve, of rocket celebrity, and although the term lucifer is now in ordinary language applied to all kinds of instantaneous light matches, its use was first restricted to those which did not contain phosphorus as an ingredient in their composition. These Congreves are of two kinds, the snapping and the silent; the former contain chlorate of potash, and are by far the best; they are less dangerous and less susceptible of being injured by damp. The silent matches contain nitre instead of chlorate of potash, and are very liable to injury from exposure. Most of the cheap foreign matches imported into this country are of the latter kind, and are not equal to the snapping matches made by Hyman, Bell, and others, in our own country. The following formulæ (German) are for the preparation of silent Congreves:—(1.) Nine parts of phosphorus, fourteen parts of nitre, sixteen parts of finely divided peroxide of manganese, well mixed and worked up into a paste of suitable consistence, by means of sixteen parts of gum arabic made into a mucilage with water. (2.) Phosphorus, four parts, nitre, ten parts, glue, six parts, red lead, five parts, smalts, two parts. Liquify the glue with the aid of a small quantity of water and a gentle heat, and to this liquified glue, at a temperature of about 145° Fah., add the nitre, the red lead, and lastly, the smalts, and make the whole into a soft mass of uniform consistence. (3.) Gum arabic, sixteen parts, phosphorus, nine parts, nitre, fourteen parts, vermilion, sixteen parts. Instead of gum arabic, mucilage of gum tragacanth may be employed. After being dipped into the composition and dried, the points of the matches may be covered with a weak solution of gum copal, to preserve them from the action of damp air.

The rationale of the action of these matches is, that substances, such as phosphorus, having a great affinity for oxygen, are mixed with a large amount of it condensed into a small space, as in chlorate of potash, nitre, &c., so that the slightest cause is sufficient to effect their combination. On this account the peroxides of manganese and lead, which abound in oxygen, are often mixed with the nitre, they act in the same way when they have once attained a red heat. Lucifer matches, especially those into whose composition chlorate of potash enters, are much less dangerous than might have been expected; this has resulted from the circumstance, that much attention has been given to reducing the inflammability of the composition to the greatest possible extent, so that the matches inflame only when strongly rubbed against rough surfaces, but not readily by pressure or shaking.

Most of the ordinary lucifer matches are dipped in melted sulphur previous to their receiving a coating of the inflammable composition, the sulphur taking fire at a comparatively low temperature, communicates it inflammability to the wood. The presence of sulphur has the objection of producing a disengagement of sulphurous acid gas from the inflammation of the match, injurious to respiration. To avoid this inconvenience, matches are dipped in oil, stearine, or melted wax, whereby they are rendered sufficiently inflammable without the use of sulphur, after which they are dipped in either of the inflammable compositions before mentioned.

Some matches are made entirely of wax or stearine, and tipped with the ordinary ignitable composition. In some cases a small wick is made to pass down the wax match, and thus the two operations of lighting a match and lighting a taper is effected at one and the same time. In other cases the lid of the match-box is furnished with a receptacle in which to place the ignited match, which burns long enough to allow of the sealing of a letter.

In 1848, Mr. Henry Archer patented a mode of making matches to be used as tapers, applicable for the purpose of sealing letters and other similar convenient purposes. These matches were made to remain in a vertical position while being con-

sumed, without the necessity of being either held between the fingers or fixed in a small hole, as had previously been the method adopted.

Mr. Newton, in 1836, and Mr. Bush, in 1842, patented the contrivance of fixing matches in rows or compartments in boxes, the interior surfaces of which were roughened; in drawing out a match it encountered a sufficient degree of friction to cause ignition.

The fusee matches employed for lighting cigars were first made of Amadou, or German tinder, of which some remarkably fine specimens were exhibited in the Prussian and Austrian departments of the Great Exhibition. Amadou is prepared from a fungus or species of mushroom, the *Boletus igniarius*, which grows on the trunks of old oak and ash trees, &c. The portion used is that underlying the outer bark, and overlying the ligneous matter; it is cut into thin slices and beaten, then boiled in a strong solution of nitre, dried, and again beaten, and once more boiled in the nitre solution. Black Amadou is impregnated with gunpowder. This prepared Amadou is tipped with an inflammable composition, which ignites on friction. Instead of Amadou, Mr. Hynam makes use of a kind of pulp similar to that employed in the manufacture of paper. This pulp is imbrued with nitre and agreeable perfumes, and being tipped with an inflammable composition, these fusees are ignited by friction in the usual way.

Mr. Jarvis Palmer took out a patent, in 1849, for improvements in matches for lighting cigars. These matches are made of the round splints usually employed and tipped with an improved mixture of slow combustible material, which, when ignited by friction, is placed in contact with the cigar, part of which adheres to the cigar, rendering it unnecessary to retain it in contact therewith. The combustible or slow-burning material is prepared as follows:—18 parts by weight of vegetable charcoal, 32 parts of sal prunella, 8 parts of Venetian red, 10 parts of cascarilla bark, 1 part of chlorate of potash, and 14 parts of water, are well mixed together, one pound of gum arabic is then added, and the whole well incorperated. The splints are dipped two or three times with this composition until sufficiently coated and then dried.

The amorphous phosphorus does not appear to have been as yet introduced into the manufacture of lucifers. One of the largest manufacturers of matches states: "I regret to say that I have not been able to introduce matches to the public made with the amorphous phosphorus; I have made some matches with it, but I fear that it will not come into general use. There are many difficulties to contend with in its use. Then, again, the matches made with it will not ignite so readily as those made with the ordinary phosphorus. I have been desirous of bringing it into general use, as it would be much cleaner, and would not have such an unpleasant smell as in the case of the ordinary kind."

ON THE MANUFACTURE OF NITRIC ACID.

The ordinary mode of obtaining this acid for commercial purposes is by heating together, in some suitable distillatory apparatus, the requisite proportions of either nitrate of potash or nitrate of soda with sulphuric acid. Since the introduction of nitrate of soda from Chili and Peru, this salt has been generally employed in the manufacture of nitric acid, inasmuch as it combines the advantage of cheapness with that of furnishing ten per cent. more of acid, and that too at a less elevated temperature than nitrate of potash. The terms *cubic nitre* and *Chili saltpetre* are commercially applied to nitrate of soda. In 1850, 234,810 cwts. were imported into this country from Peru, and 23,041 cwts. from Chili. In the same year 367,680 cwts. of nitrate of potash were imported from the British possessions in the East Indies. The apparatus employed in the distillation of nitric acid are either retorts of glass or earthenware set in sand-pots in a gallery furnace, or cast-iron cylinders and pots. When iron cylinders are used, they are set in brick-work like coal-gas retorts, and fitted with moveable lids. The charge of nitrate having been introduced the cylinder is closed, and the requisite quantity of sulphuric acid introduced through a safety-tube. In the case of iron pots (the form of apparatus most commonly used), these are usually about 80 to 100 gallons capacity, set in brick-work, and covered with a stout flat stone divided into two parts; a portion of each half is cut away in the centre, so that when the stone is placed on the pot a round hole is left in which an earthenware still-head is secured by means of luting. These pots

are much better than cylinders, which are very soon worn out, and the acid obtained more impure. In either case the acid, on its exit from the distillatory apparatus, passes through connecting tubes into a series of earthenware receivers or glass carboys, in which it is condensed. In using the iron pots the nitrate of soda is placed in the still and the cover then luted down, after which the sulphuric acid is added through the aperture in the cover, and the earthenware head is immediately attached. The sulphuric acid unites with the soda of the nitrate, forming a residuum commercially known as salt-cake, or rough sulphate of soda, whilst the nitric acid passes over and is condensed. If the nitrate of soda contain only five per cent. of refraction, and the sulphuric acid is about 1.840 or even 1.835, then 400 parts of nitrate will require 450 of acid, water being put into the receivers. Five cwt. of nitrate for a charge will require in ordinary weather about sixteen receivers. The residue obtained when nitrate of potash is employed is bisulphate of potash or sal-enixum. Instead of sulphuric acid clay was at one time employed in the manufacture of this acid, and more recently sulphate of iron. In the case of clay the decomposition of the nitrate was effected by means of the silica therein contained. In both cases, however, it was found that great loss arose from decomposition of part of the nitric acid, for when clay was used there was not sufficient water present to give the requisite stability to the acid, which can only exist, at high temperatures, in the state of hydrate; and in the case of using sulphate of iron the nitric acid being derived from the nitrate of iron first produced, underwent decomposition at a high temperature.

M. Mallet, a chemical manufacturer of Paris, well known for his researches in the purification of coal gas, took out a patent in France for obtaining nitric acid by the decomposition of nitrate of soda by means of boracic acid, thus obtaining biborate of soda or borax of commerce as a residuum. The successful carrying out of this process on the commercial scale, is, however, dependent on a singular circumstance. Strong nitric acid is more volatile than weaker acid, and hence it is more readily driven off from its combination with soda in a concentrated than in a diluted form. Boracic acid in its crystallized state contains three atoms of water, if therefore we take two atoms of this acid, we have six atoms of water to unite with one atom of nitric acid, capable of being disengaged from nitrate of soda, whereas this quantity of nitric acid requires at most but two atoms. The secret therefore is to dry the boracic acid in the first instance, so as to get rid of the surplus water. This is readily effected at a temperature of 212° Fah., at which two-thirds of the water readily leave the boracic acid, and thus afford a mono-hydrated compound, two atoms of which contain precisely the amount of water required for one atom of nitric acid, and also of boracic acid requisite for the production of biborate of soda. There are some peculiarities connected with the application of the necessary temperature, but these are of less importance.

Various methods for obtaining nitric acid by means of the waste oxides of nitrogen, in the manufacture of oxalic acid, were given in the March number of the Pharmaceutical Journal, 1852, page 407.

The following method of obtaining nitric acid was patented by De Sussex in 1846. Equal parts by weight of nitrate of soda or potash and an alkaline earth are intimately mixed and placed in a cylinder or other vessel of a convenient form and size, and made of iron, fire-clay, or any other substance that will bear red heat. The vessel is provided with an opening for the introduction of the materials, and is so constructed as to be capable of being made air-tight. Another opening is also provided, in which an exit-pipe is inserted, communicating with a suitable condenser or receiver. Heat is then so applied as to raise the materials in the vessel to a red heat or upwards, which is maintained for about twelve hours, by which time the required decomposition of the nitrate is effected, and the whole of the nitric acid driven off and collected. Lime is the earth preferred by the patentee for this purpose, as cheaper and more readily obtainable, but he states that any of the alkaline earths, lime, baryta, strontia, and magnesia, or any mixture of any two or more of them, will all produce the same result of decomposing a nitrate of soda or potash. This process for obtaining nitric acid was part of a new mode of manufacturing soda, which we shall have occasion to notice in a future number of the Journal.

Anhydrous Nitric Acid.—In subjecting nitrate of silver to the action of perfectly dry chlorine, M. Deville, Professor of Chemistry at the Faculty of Sciences, Besançon, succeeded in isolating anhydrous nitric acid, the existence of which was

demonstrated by several analyses. This beautiful substanc appears in the form of colourless crystals, of perfect brilliancy and clearness, and of a centimetre (0.393 inch) in length. These crystals are six-sided prisms, fusing at a temperature of about 85° Fah., and whose boiling point is about 113° Fah. Placed in contact with water much heat is disengaged, and the crystals are dissolved without acquiring any colour and without the disengagement of gas. On the addition of baryta, nitrate of that base is produced. M. Duville's paper on this subject is contained in the ninth volume of this Journal, at page 36.

WOOD WOOL.

Near Breslau, in Silesia, in a domain called the *Prairie of Humbold*, there are two establishments which are very remarkable, whether we view them separately with reference to the particular objects of each, or regard them in connection—the one is a manufactory which converts the leaves of the Scotch fir into a sort of cotton or wool; the other affords salutary baths for the sick from the water resulting from the fabrication of this vegetable wool. Both have arisen under the direction of a head inspector of forests, M. de Pannewitz, the inventor of a chemical process, by which there can be drawn from the long slender leaves of firs a very fine fibre, which has been called *tree wool*, or *wool of wood* (*Laine des Bois*), because it curls, felts, and can be spun like common wool.

The leaves of pines, spruces, and of conifers generally, are composed of a bundle of extremely fine tenacious fibres, held together by a resinous substance, which has the form of thin pellicles. By boiling, and the use of chemical reagents, this resinous substance is dissolved, the fibres are then easily separated, washed, and cleared from all foreign bodies. According to the mode of treatment to which it is subjected, the woolly substance acquires a finer or coarser quality. The finer is employed for wadding, and the coarser for stuffing mattresses. Such is a brief explanation of the discovery due to M. de Pannewitz. The *Pinus sylvestris* has been preferred to the spruces in this manufactory, because it has longer leaves; but we may reasonably suppose that in countries where other species of conifers exist, with equally long foliage, a similar produce could be obtained.

We need not fear divesting the fir of its leaves, partially, even in its youth. For the continuation of its growth, this tree requires only some whorls of leaves at the extremity of each branch, so that without injuring the tree we may take off all the leaves on the lower parts of the branches. But this should be done whilst they are green, otherwise the woolly substance cannot be extracted. The leaves are gathered by the poor people, and their earnings at this employment are very good. The gatherings are made every second year. A pound of leaves is gathered from a branch of the thickness of the finger. A beginner may collect thirty pounds a day; but one accustomed to the operation can collect as many as two hundred pounds, and much more than this if the trees are felled.

The fibrous substance was first used as a substitute for cotton wadding, or for wool in quilted coverings. In 1842, five hundred of these coverings were purchased for the hospital of Vienna, and after several years' proof, a fresh order was given. It was remarked amongst other things that, under the influence of the fir-tree wool, no species of insect lodged in the beds; and that the aromatic odour which the substance gave out was not only agreeable but likewise beneficial to health. A third order very soon followed the preceding, and the penitentiary of Vienna was also furnished with the same kind of coverings. These have been adopted, and also mattresses stuffed with the same kind of wool, in the hospitals of Berlin, and in that of the Invalids of Breslau. Five years' experience has shown that fir-tree wool is exceedingly well adapted for quilting and stuffing, and that it is very durable.

At the end of five years a mattress of this kind of wool costs less than the palliasse. Carpeting in which this substance has been introduced has not been attacked by the moth. It is only one-third of the expense of hair, and the most skilful upholsterer could not distinguish a piece of furniture stuffed with it, from one stuffed with hair.

The substance, moreover, may be spun and twisted. The finest gives a thread like that of hemp, and as strong. Spun, twisted, and combed (like cloth), it furnishes an article which may be used for carpets and horse-cloths. The fabrics of

Zuckmantel, and of the prairie of Humbold, have actually gained for M. Weiss a bronze medal at the Berlin Exhibition, and a silver medal at that of Altenbourg.

In the preparation of the fir-tree wool, there is produced an ethereal oil of fragrant sweetness. This oil is at first of a green colour; exposed to the light, it takes an orange-yellow tint; replaced in the dark, it again becomes green. By rectification, it is rendered colourless as water. It is different from the essence of turpentine, extracted from the stem of the same tree. Employed in various affections of rheumatism and gout, and applied as balm for wounds, it has produced salutary effects; and also in vermicular complaints and for tumours. When rectified it answers as well as nut oil for burning in lamps. It quickly and completely dissolves caoutchouc. The perfumers of Paris have procured a quantity of it.

The liquid residue from the boiling of the fir leaves exercises a very salutary action when used as a bath. A bathing establishment has therefore been annexed to the manufactory. This liquid has a green colour, with more or less of a brownish tinge, according to circumstances and the mode of preparation. It is sometimes gelatinous and balsamic, and sometimes acid; in the latter case it contains formic acid. During the nine years that the bathing establishment has existed, its reputation and the number of persons availing themselves of its beneficial effects have kept increasing. When it is necessary to augment the strength of the baths, there is added an extract obtained by distillation from the ethereal oil above mentioned. This extract likewise contains formic acid. The residual liquid is also concentrated to the form of an extract, and sent out in sealed bottles for domestic use.

The membranaceous substance obtained by filtration from the washings of the fibre is moulded into the form of bricks, and dried for fuel and light. Fifty tons of the wool leaves a quantity of combustible matter equal in value to 6480 cubic feet of pine wood.—*Flore des Serres*, December, 1852.

Note by the Editor.—Samples of this material were exhibited in the Great Exhibition, and are thus spoken of by Professor Solly in his report upon Class IV. (*Jury Reports*, p. 103):—"A new fibrous material, proposed for wadding, for clothing, and for upholstery work, in stuffing mattresses, &c., is exhibited by C. G. Fabian, of Humboldsan, near Breslau. This substance, which is called 'Pine wool,' is prepared from the leaves or needles of pine trees; it is soft and somewhat elastic, though the fibre is very weak, so that it would perhaps soon mat and felt together in mattresses. It has been found to be very cleanly and peculiarly free from the attacks of insects, and might probably be advantageously employed, mixed with some stronger and more elastic fibre. The jury awarded a prize medal for this substance." It is to be observed that the remark made on this substance by Dr. Lindley, at page 1054 of the Official Catalogue, was written before the Prussian packages had been opened, and their contents examined. Before being seen, the term "Pine-needle wool" was unintelligible, in the absence of all explanation of the nature of an article unknown in England. A short account of this material appeared in *Chambers's Journal* sometime since.—*Gardeners' Chronicle.*

CONTRIBUTIONS TO THE KNOWLEDGE OF THE MANUFACTURE OF GAS.

BY E. FRANKLAND, PH.D.

(Read before the Manchester Literary and Philosophical Society, January 13, 1852.)

(*Abstracted by the Author.*)

[This article has been in type several months, and has been unavoidably deferred on account of pressure of other matter.]

The constituents of purified gas, as used for illuminating purposes, are hydrogen, light carburetted hydrogen, carbonic oxide, olefiant and other gases, having the general formula $C_n H_n$, the vapours of hydrocarbons of the form $C_n H_{n-6}$, and other hydrocarbons, the formulæ of which are unknown; in addition to these, coal-gas usually contains small quantities of nitrogen, oxygen, and bisulphide of carbon vapour; but these, for our present purpose, may be entirely disregarded.

It has always been asserted, that hydrogen and carbonic oxide possess no illu-

minating power, and that the light emitted by coal-gas is due to light carburetted hydrogen, olefiant gas, and other hydrocarbons; I hope, however, to prove, by the experiments detailed below, that light carburetted hydrogen is, for all practical purposes, also entirely devoid of illuminating power; and that therefore the whole of the light giving effect is due to the olefiant gas and hydrocarbons. This is an important point, as we shall find that it much simplifies the estimation of the illuminating power of any gas, and teaches us that the nature of the combustible diluents of the olefiant gas and hydrocarbons has no effect whatever upon the quantity of light emitted by the mixture.

The constituents of coal-gas may therefore be divided into two classes, viz., illuminating and non-illuminating constituents. To the first will belong olefiant gas and the other hydrocarbons above mentioned; and to the second, hydrogen, light carburetted hydrogen, and carbonic oxide. To the first class alone the illuminating power of the gas is due; but one member at least of the second class is also indispensable as a diluent, without which we should find great difficulty in consuming the hydrocarbons without the production of much smoke. The members of the first class are all decomposed at a white heat instantaneously, at a red heat more slowly, depositing the whole, or the greater part of their carbon in the form of very fine particles, which become so many centres for the radiation of light in a gas flame; and the greater the number of particles existing in a flame at the same time, the greater will be the light emitted by that flame. It is therefore evident, that the value of these hydrocarbons for the production of light, depends directly upon the quantity of carbon contained in a given volume, and is altogether independent of the hydrogen with which this carbon is combined; consequently, the densest or most easily condensible of these gases and vapours of the first class are those which possess the highest illuminating power. All the compounds belonging to this class are, as before stated, decomposed more or less rapidly at a red heat; in the ordinary process of gas-making, the interior walls of the retorts soon become coated with a stratum of carbon derived from this source. Now the extent of this decomposition must depend, first, upon the length of time during which they are exposed to the heated materials, and, secondly, upon the number of particles which are in contact with the red-hot surface; consequently, it will be diminished, first, by removing the gases rapidly from the retort; and, secondly, by the mixture of the illuminating constituents with the non-illuminating ones: for it is evident, that the number of particles of olefiant gas in contact with a given surface, would only be half so great if this gas were diluted with an equal volume of hydrogen, as it would be without such an admixture. Besides the use of the second class, or non-illuminating gases, which has been already stated, they are of value as forming a medium for the solution of the vapours of such hydrocarbons as exist in the liquid or even solid state, at the ordinary temperature of the atmosphere; and they thus enable us to convert an additional quantity of illuminating materials into the gaseous form, which they retain permanently unless the temperature fall below the point of saturation. The gain in illuminating power which is thus obtained, will be perhaps better seen from the following example. If 100 cubic inches of olefiant gas, being allowed to saturate itself with the vapour of a volatile hydrocarbon containing three times the amount of carbon in a given volume of its vapour as that contained in an equal volume of olefiant gas, took up, or dissolved in this way three cubic inches of hydrocarbon vapour, then, if we express the value in illuminating power of one cubic inch of olefiant gas as unity, the illuminating power of the 103 cubic inches of the mixture of olefiant gas and hydrocarbon vapour will be 109; now, if we mix these 103 cubic inches with 100 cubic inches of hydrogen, the mixture will be able to take up an additional three cubic inches of the hydrocarbon vapour, and the illuminating power of the 206 cubic inches will then become 118. Thus the hydrogen produces a gain in illuminating power equal to nine cubic inches of olefiant gas, or nearly 4.5 per cent. upon the total volume of mixed gases. When we consider that coal-naphtha contains hydrocarbons of great volatility, and which are no doubt the surplus remaining after the saturation of the gas from which they have condensed, the importance of this function of the non-illuminating class of combustible gases will be sufficiently evident. I may here remark, that incombustible gases could not be employed for this purpose, since their cooling influence upon the flame during the subsequent burning of the gas would diminish the light to a far greater extent than

the hydrocarbon vapour could increase it. It is evident, that all the three non-illuminating gases forming the second class, would perform both the offices I have assigned to them equally well; and therefore we have as yet seen no reason for giving our preference in favour of any one of these diluents. If, however, we study their behaviour during combustion, we shall find, that where the gas is to be used for illuminating purposes, hydrogen has qualities which give it a very decided preference over the other two. When gas is used for lighting the interior of public buildings and private houses, it is very desirable that it should deteriorate the air as little as practicable, or in other words, it should consume as small a quantity of oxygen, and generate as little carbonic acid as possible; the oppressive heat which is often felt in apartments lighted with gas also exemplifies the great advantage of its generating a minimum amount of heat.

One cubic foot of light carburetted hydrogen at 60° F., and thirty inches Bar., consumes two cubic feet of oxygen during its combustion, and generates one cubic foot of carbonic acid, yielding a quantity of heat capable of heating 5 lbs. 14 oz. water from 32° to 212°.

One cubic foot of carbonic oxide consumes half a cubic foot of oxygen, generates one cubic foot of carbonic acid, and affords heat capable of raising the temperature of 1 lb. 14 oz. of water from 32° to 212°.

One cubic foot of hydrogen consumes half a cubic foot of oxygen, generates no carbonic acid, and yields heat capable of raising the temperature of only 1 lb. 13 oz. water from 32° to 212°.

Thus, light carburetted hydrogen is very objectionable as a diluent, not only on account of the carbonic acid which it generates, and the large quantity of oxygen it consumes, but also by reason of the very great amount of heat, which in relation to its volume it evolves on combustion, the absolute thermal effect being more than three times as great as that of either of the other gases. The quantity of heat evolved by the combustion of equal volumes of carbonic oxide and hydrogen is nearly, and the amount of oxygen consumed, quite the same; but the quantity of carbonic acid evolved by the first gives a decided preference to hydrogen as the best diluent.

The same comparison also shows, that where the gas is to be used for heating purposes, and the products of combustion are carried away, light carburetted hydrogen is by far the best diluent.

The experiments of Dulong on the absolute thermal effect of hydrogen, light carburetted hydrogen, and carbonic oxide, are taken as the basis of the foregoing calculations.

These remarks indicate the objects that should be chiefly regarded in the generating department of the manufacture of gas for illuminating purposes: these are,

1. The formation of a due proportion of illuminating and non-illuminating constituents, so that on the one hand, the combustion of the gas shall be perfect, and without the production of smoke or unpleasant odour; and on the other, the volume of gas required to produce a certain amount of light shall not be too great.

2. The extraction of the largest possible amount of gaseous illuminating compounds from a given weight of material.

3. The presence of the largest possible proportion of hydrogen amongst the non-illuminating constituents, to the exclusion of light carburetted hydrogen and carbonic oxide, so as to produce the least amount of atmospheric deterioration in the apartments in which the gas is consumed.

I have not introduced these preliminary observations to show the inductive reasoning by which the process of gas-making described below was arrived at, for I believe that, so far as these considerations are concerned, that process was accidentally adopted; but I bring them forward to illustrate and explain the principles involved in it, and also to show that a close study of the chemistry of gas-manufacture would have led to the discovery of this more philosophical method of gas-generation long ago.

Various attempts have been made to estimate the illuminating power of coal and other gases from the analytical results they yield, but hitherto no certain method of accomplishing this has been established. Dr. Henry regarded, and not unjustly, the consumption of oxygen by a given volume of gas to be a rough estimation of its illuminating power; but it is evident, that although generally those gases which have the highest illuminating power consume most oxygen, yet this is not always the

case; for a gas containing 10 per cent. of olefiant gas, 20 per cent. of light carburetted hydrogen, and 70 per cent. of hydrogen, would consume much less oxygen during combustion than one containing only 5 per cent. of olefiant gas, and in which the proportion of light carburetted hydrogen and hydrogen were reversed, although its illuminating power would be twice as great.

It will be seen from what has been already said respecting the illuminating power of carbo-hydrogens, that the more dense these are, the greater does that illuminating power become. This important fact was first pointed out in reference to coal-gas, by Mr. Leigh,* who was also the first to make an approach towards estimating the illuminating power of gas from its analysis. Mr. Leigh regards the illuminating power of coal-gas as due to light carburetted hydrogen, olefiant gas, and hydrocarbons, and that the value of the latter is directly proportional to the quantity of oxygen required for their combustion. If we leave the light carburetted hydrogen entirely out of the calculation, as I shall prove that this gas has practically no illuminating power, this method generally gives results not far from the truth, but which are nevertheless liable to very considerable error, from the fact that the amount of oxygen consumed does not depend alone upon the luminiferous ingredients of the carbon, but also upon the amount of hydrogen combined with that element, and which is necessarily a variable quantity, being in some of the hydrocarbons in the proportion, $C : H = n : n$; in others, $C : H = n : n-6$; and in others even, $C : H_{2n} : n-10$. If, however, we estimate the volume of carbon vapour contained in the luminiferous hydrocarbons, and make that the basis of our calculation, we avoid this source of error, and obtain a correct expression for the illuminating power, however much the composition of the hydrocarbons may vary. I have already pointed out a method for accomplishing this;† and Mr. Leigh, in the memoir to which I have already alluded, also describes a similar plan which he employs for the determination of the consumption of oxygen by these bodies.

The method which I have adopted in the annexed experiments is the following:

A known quantity of the gas previous to the action of sulphuric acid is exploded with an excess of oxygen, and the volume of carbonic acid produced accurately noted. Another known volume of the same gas, after the withdrawal of the hydrocarbons by sulphuric acid, is then similarly exploded with oxygen, and the carbonic acid formed also estimated. Thus the percentage amount of hydrocarbons, plus the volume generated by the non-luminous gases alone, being known, it is easy to calculate the amount of carbonic acid generated by one volume of the hydrocarbons. Thus if we designate the percentage of hydrocarbons absorbed by sulphuric acid, by A, the volume of carbonic acid generated by 100 volumes of the original gas, by B, the carbonic acid formed by the residual gas after absorption of hydrocarbons, by C, and the volume of carbonic acid generated by the combustion of one volume of the hydrocarbons alone by X, we have the following equation:

$$X = C - B$$

and therefore the amount of carbonic acid generated by one volume of the hydrocarbons is represented by

$$\frac{C-B}{A}$$

but as one volume of carbon vapour generates one volume of carbonic acid, this formula also expresses the quantity of carbon vapour in one volume of the luminiferous constituents.

For the purpose of comparison, however, I represent the value of these hydrocarbons in their equivalent volume of olefiant gas, one volume of which contains two volumes of carbon vapour; for this purpose, the last expression need only be changed to

$$\frac{C-B}{2A}$$

Thus, if a gas contains ten per cent. of hydrocarbons, of which one volume contains three volumes of carbon vapour, the quantity of olefiant gas to which this ten per cent. is equivalent, will be 15.

The illuminating power of the coal gases mentioned below has also been practically

* Memoirs of the Manchester Lit. and Philosoph. Soc., ix. (new series), 393.
† Chem. Soc. Quar. Journ., ii., 275.

tested by Bunsen's photometer, and the results are corrected to those which would have been obtained by using a sperm candle, burning 120 grs. per hour; and one of these candles, burning for ten hours, is taken as the standard of comparison for the total quantity of light yielded by a given volume of gas; thus, when it is stated that the total quantity of gas produced from one ton of coal is equal to 4816 candles, it is intended that the light afforded by the gas is equal to that yielded by 4816 sperm candles, each burning ten hours, and at the rate of 120 grs. per hour.

The following experiments, which I lately made at the request of two merchants of this town, upon a new process of gas-making, known as White's hydrocarbon process, serve to illustrate the principles laid down in the preceding pages.

Mr. White's process consists essentially in the generation of non-illuminating combustible gases by the action of steam upon charcoal, coke, or other substances, in a separate retort, and the introduction of these gases, along with an excess of watery vapour, into the retort in which the illuminating gases are being generated, and in such a manner, that these latter gases shall be swept out of the retort as rapidly as possible, and removed from the destructive influence of a high temperature. The excess of steam accompanying the water-gases into the second retort, performs there a remarkable office; it reacts upon the tar and fuliginous matter in a manner that will be described below, and gives rise to the formation of a great additional quantity of gas, a very large proportion of which is pure hydrogen. That this reaction of the steam should be confined entirely to the tar and other refuse matters, and should not affect the luminiferous gases generated in the same retort, is scarcely conceivable, since the constitution of tar and gaseous hydrocarbons is so nearly alike; yet any destruction of illuminating principles that may be thus caused, is immensely overbalanced by the quantity of these principles, which are saved from decomposition by their rapid removal from the influence of a high temperature, and by the vapours of volatile hydrocarbons with which the water-gases remain more or less saturated.

WHITE'S PROCESS APPLIED TO RESIN.

I. PRACTICAL RESULTS.

	1st Exp.	2d Exp.	3d Exp.	4th Exp.	Average.
Gas produced per ton of resin	26000 cbc. ft.	28120 cbc. ft.	30820 cbc. ft.	29300 cbc. ft.	30000 cbc. ft.
Resin-oil produced per ton of resin	88.2 galls.	64 galls.	41.8 galls.	84.8 galls.	69.9 galls.
Coal consumed in heating retorts	1336 lbs.	1336 lbs.	1336 lbs.	1496 lbs.	1336 lbs.
Charcoal for water-gas	83 "	199 "	111 "	97 "	98 "
Water used	606 "	639 "	790 "	696 "	669 "

II. ANALYTICAL RESULTS.

Percentage Composition of Purified Gases.

	1st Exp.	2d Exp.	3d Exp.	4th Exp.	Average.
Olefiant gas and hydrocarbons	8.27	7.94	7.78	8.53	8.13
Light carburetted hydrogen	18.76	45.06	22.79	32.25	29.71
Hydrogen	42.03	37.59	50.27	43.62	43.38
Carbonic oxide	30.93	9.41	19.16	15.60	18.78
	100.00	100.00	100.00	100.00	100.00

Illuminating Value of Olefiant Gas and Hydrocarbons expressed in Equivalent Quantity of Olefiant Gas.

1st Experiment.	2d Experiment.	3d Experiment.	4th Experiment.	Average.
11.58 per cent.	11.11 per cent.	10.89 per cent.	11.94 per cent.	11.38 per cent.

WHITE'S PROCESS APPLIED TO COALS AND CANNELS.

In order to obtain a fair comparison of the results yielded by the various coals when distilled alone (as in the usual process of gas-making) with those obtained from the same coals when treated with water-gas, according to the hydrocarbon process, each coal was distilled first by itself, and then with the addition of water-gas, equal weights being used for each experiment.

I. PRACTICAL RESULTS.

Name of Coal.	Cubic feet of gas per ton.		Illuminating power per ton in Sperm Candles.		Gain per ton by White's process.		Gain per cent. by White's process.	
	By old process.	By White's process.	By old process.	By White's process.	Quantity of gas in cubic feet.	Illuminating power in sperm candles.	Quantity of gas.	Illuminating power.
Wigan cannel (Ince Hall)	10,900	16,120	4,816	6,448	5,220	1,632	47.9	33.9
Wigan ditto (Balcarres)	10,440	15,500	4,156	5,920	5,060	1,764	48.5	42.4
Boghead cannel	13,240	28,160	11,240	21,508	14,920	10,268	178.5	88.4
Ditto, 2d exp.	...	51,720	...	29,088	38,480	9,578	290.6	82.4
Lesmahago cannel	10,620	29,180	7,620	13,934	18,560	6,314	174.8	82.8
Methyl cannel	9,560	26,460	5,316	11,088	16,940	5,772	176.2	108.6

Quantity of Coal or Cannel requisite for producing Light equal to 1000 *Sperm Candles each burning Ten Hours, at the rate of* 120 *grs. per Hour.*

Name of Coal.	Weight of Coal.	
	By old process.	By White's process.
Wigan cannel (Ince Hall)	465.1 lbs.	347.4 lbs.
Wigan cannel (Balcarres)	539.0 "	378.4 "
Boghead cannel	197.5 "	104.8 "
Lesmahago cannel	295.9 "	169.7 "
Methyl cannel	445.9 "	306.7 "
Newcastle coal (Pelton)	745.7 "	

II. ANALYTICAL RESULTS.

Percentage Composition of Gases.

	Wigan cannel. (Ince Hall).		Boghead cannel.		Lesmahago cannel.		Methyl cannel.		Pelton coal.
	By old process.	By new process.	By old process.	By new process.	By old process.	By new process.	By old process.	By new process.	By old process.
Hydrocarbons and olefiant gas	10.81	10.55	24.50	14.12	16.31	10.89	14.48	11.06	3.87
Light carburetted hydrogen	41.99	27.20	26.38	22.25	42.01	18.94	38.75	22.89	32.87
Hydrogen	35.94	47.39	10.54	45.51	26.84	55.89	33.32	45.58	59.05
Carbonic oxide	10.07	14.86	6.58	14.54	4.18	15.02	13.40	20.44	12.89
Carbonic acid	1.19	0.00	0.00	3.78	.66	.06	.05	.03	.32
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Illuminating Value of Olefiant Gas and Hydrocarbons expressed in Equivalent Quantity of Olefiant Gas.

Wigan cannel, by old process.	Wigan cannel, by new process.	Boghead cannel, by old process.	Boghead cannel, by new process.	Lesmahago cannel, by old process.	Lesmahago cannel, by new process.	Methyl cannel, by old process.	Methyl cannel, by new process.	Pelton coal, by old process.
per cent. 16.15	per cent. 13.72	per cent. 31.11	per cent. 19.84	per cent. 28.50	per cent. 19.05	per cent. 18.53	per cent. 14.04	per cent. 7.16

The foregoing results bring to light several circumstances highly favourable to the hydrocarbon process of gas-making, which could scarcely have been predicted previous to the actual trials being made. The first and most important of these, is the disappearance of the carbonic acid contained in the water-gas, during its passage through the coal retort; this disappearance is so complete, that the resulting gaseous mixture actually contains a much smaller percentage than does the gas obtained by the distillation of the coal alone. There is little doubt that this removal of the carbonic acid depends upon its conversion into carbonic oxide by the carbonaceous matters in the coal retort; and of these, the coke is probably the most active, since the volatile matters do not differ materially from those produced during the distillation of resin; and these we have seen fail to remove the acid gas.

Another favourable circumstance occurring in the process, consists in the relatively small quantity of carbonic oxide that is produced. A large proportion of this gas would be equally objectionable with a high percentage of light carburetted hydrogen, on account of the quantity of carbonic acid formed during its subsequent combustion. A reference to the composition of the foregoing gases shows us, however, that in all cases, the amount of carbonic acid generated is less than that formed by the combustion of an equal volume of the gas obtained from the same coals by the ordinary process of manufacture, and in some cases it is even less than that produced by a pure coal-gas flame giving an equal light. The favourable position which the hydrocarbon gases occupy in the above comparison, would not have been attained, if the whole, or even a very large portion of the water-gas had been generated in the charcoal retort; for when water-gas alone is generated, it is found to consist of hydrogen and carbonic oxide mixed with quantities of carbonic acid, varying from 0 to 15 per cent., according to the heat employed and other circumstances. When the percentage of the acid gas is 0, then the volumes of hydrogen and carbonic oxide are equal; and as no important quantity of carbonic acid was ultimately present in the gases produced in the foregoing experiments, the whole of that gas entering the coal retort must be converted into carbonic oxide, and therefore we may consider the water-gas entering the coal retort as being composed of equal volumes of hydrogen and carbonic oxide. Now, if the increase in the total quantity of gas produced by the application of the hydrocarbon process to any given coal or cannel, were due only to the water-gas formed in the charcoal retort, it is obvious that the gain in carbonic oxide ought to be equal to the gain in hydrogen; but a glance at the analytical results shows that this is far from being the case. Thus, for instance, with Boghead gas, the proportion is

Gain in H : gain in CO = 3 . 5 : 1,

and with Lesmahago cannel,

Gain in H : gain in CO = 4 . 6 : 1

It is therefore evident that a large quantity of water-gas must be generated by the action of steam upon the carbonaceous materials in the coal retort, and that this water-gas contains a very much greater percentage of hydrogen than that produced in the charcoal retort. Although we are not yet sufficiently acquainted with the action of watery vapour upon organic substances at high temperatures to state positively the cause of this excess of hydrogen, yet there can be little doubt that it is derived from the action of steam upon the hydrocarbons of the tar. For, as watery vapour in acting upon carbon transfers its oxygen to that element, forming carbonic oxide and an equal volume of hydrogen, so also, when steam acts upon a compound of carbon and hydrogen, it produces carbonic oxide, but in doing so, sets at liberty not only its own hydrogen, but that of the carbo-hydrogen also; and thus the volumes of hydrogen and carbonic oxide remain no longer equal, but the volume of the former becomes double, treble, or even fourfold that of the latter.

An important feature in the history of a gas for illuminating purposes, is its behaviour when exposed to cold. I have therefore submitted several of the above gases to a temperature of 32°, and carefully ascertained the loss of volume by liquefaction of hydrocarbons. These experiments, as might be expected, show that the gases made by the new process, suffer less loss by this refrigeration than those made from the same material by the old process.

Name of Gas.	Cubic feet of hydrocarbons condensed from 100 cubic feet of gas, on exposure to a cold of 32° F.
Boghead, by old process	4.42 cubic feet
Ditto, by new process	.24 "
Methyl, by old process	.33 "
Ditto, by new process	.07 "
Ince Hall, by old process	.37 "

The percentage amount of olefiant gas contained in the Pelton gas, and the gases of the Great Central and City of London Companies, would lead us to infer that their illuminating power is much lower than is really the case; for, according to the experiments upon cannel gases, it appears that when a consumption of five feet per hour produces a light equal to twenty candles, the gas contains 13.72 per cent. of olefiant gas, or its equivalent in richer hydrocarbons; and hence, we should expect that a gas containing only half this amount, would, when burnt at the same rate, produce a light equal only to ten candles, instead of thirteen, as is found to be the case. This excess of illuminating power in the case of *coal* gases over that indicated by analysis, is probably owing to the presence of luminiferous constituents not condensible either by fuming sulphuric acid, or by chlorine; the nature of these constituents, and the cause why they cannot be detected by our present methods of gas analysis, I have already pointed out.* The following table exhibits this difference between the value of olefiant gas in coal-gas, compared with that in cannel-gas, and shows also, that in the case of the latter, the illuminating power is always directly proportional to the amount of olefiant gas to which the percentage of condensible hydrocarbons is equivalent. The establishment of this rule, with regard to gases having such different percentages of light carburetted hydrogen as the Boghead gas, with and without water-gas, I hold to be conclusive evidence that light carburetted hydrogen has no higher illuminating power than hydrogen or carbonic oxide.

Value of one cubic foot of the olefiant gas, contained in the following gases, expressed in sperm candles, each burning ten hours, at the rate of 120 grs. per hour.

CANNEL GASES.

	Candles.
Ince Hall cannel	2.93
" with water-gas	2.96
Boghead cannel	2.80
" with water-gas	2.86
Lesmahago cannel	2.58
" with water-gas	2.54
Ramsay's Newcastle cannel	2.88
" with water-gas	2.86
Methyl cannel	3.04
" with water-gas	3.03

COAL GASES.

Pelton coal	4.23
City Company's gas (coal)	3.73
Great Central Company's gas (coal)	3.91

In conclusion, the advantages resulting from the application of Mr. White's hydrocarbon process to coals and cannels may be thus summed up:—

1. It greatly increases the produce in gas from a given weight of coal or cannel, the increase being from 46 to 290 per cent., according to the nature of the material operated upon.

2. It greatly increases the total illuminating power afforded by a given weight of coal, the increase amounting to from 12 to 108 per cent., being greatest when coals affording highly illuminating gases are used.

3. It diminishes the quantity of tar formed, by converting a portion of it into gases possessing a considerable illuminating power.

4. It enables us profitably to reduce the illuminating power of the gases produced from such materials as Boghead and Lesmahago cannels, &c., so as to fit them for burning without smoke and loss of light.

5. In addition to these positive advantages, the use of this process does not incur any additional expense in the working of the apparatus, the wear and tear of retorts, or the purification of the gas, and beyond a change of retorts, it involves no alterations in the construction of furnaces and apparatus at present employed in gas manufactories conducted on the old system.—*Quarterly Journal of the Chemical Society.*

* Chemical Society's Quarterly Journal, iii., 42.

ON THE TESTS FOR THE CINCHONA-ALKALOIDS, KINOVIC ACID, KINIC ACID, AND OXIDIZED TANNIN (CINCHONA RED), IN CINCHONA BARKS.

BY DR. F. L. WINCKLER.

Of all long-known drugs none have in recent times so much engaged the attention of Chemists as cinchona bark—the discovery of the various alkaloids contained in it having afforded a safe standard for the determination of its goodness.

This circumstance has been accompanied by a large number of results, which are of great importance in medical practice. It has removed the uncertainty of the notion of genuine and spurious barks, and made it possible to distinguish the former from the latter, and to determine their real value.

The excellent work of Von Bergen forms the foundation of our knowledge of the cinchona barks. Its theoretical part contains everything that could be obtained at the time of its appearance; but Von Bergen's account of the mercantile relations of this drug is of greater value, because nothing certain was known on this point before, and because for the medicinal use of barks an accurate knowledge of the material imported is certainly of greater importance than the origin of the barks. Notwithstanding all our present information a long time must elapse before we can accurately arrange the barks imported into Europe, because in consequence of the greatly increased consumption, for the purpose of obtaining the alkaloids, new sources are rendered necessary, and new districts in the native country are explored, by which, doubtless, new species of cinchona are discovered.

The correctness of this view is shown by the present occurrence of a considerable number of barks which were hitherto unknown; as for example, the barks containing quinidine and paricine, and the numerous sorts of the so-called yellow barks; and it may without hesitation be asserted that these barks contain also a larger number of alkaloids than is known at present.

I have read with much interest Weddell's excellent work, from which Dr. Riegel some time since extracted (See Pharmaceutical Journal, vol. ix., p. 224) the information which is of most importance to the Pharmaceutist. Although I am far from undervaluing the high merits of this distinguished traveller, the successor of Humboldt and Pöppig, I am notwithstanding of opinion that too great importance must not be attached to his researches. I consider that his proposal to determine the goodness of barks by their anatomical structure, has no greater value than as an application to botany generally, and to vegetable physiology in particular, for I have convinced myself by numerous and most carefully performed experiments that his assertion, that the shortly fibrous barks contain the largest proportion of alkaloid cannot be admitted, as its truth has been directly disproved. It is only applicable to calisaya bark, and even in that case has many exceptions. Were this alone sufficient to raise doubts about the possibility of judging of the goodness of barks by their structure, there is also another circumstance to be taken into consideration. The anatomical structure of bark is, as is well known, uninterruptedly progressive during vegetation: each stage offers a new formation, the bark of the trunk appears very different from that of the larger branches, and that of these varies again in its structure from the bark of the smaller branches. Lastly, we ought to examine the barks as Weddell did, in their fresh condition, in order to be enabled to judge of their structure. These views of Weddell's, however interesting they may be in other respects, are, I am convinced, of a very subordinate value for medical practice. We must, therefore, still follow the chemico-analytical route, if we wish to establish a scientific and safe classification of the cinchona barks.

Dr. Riegel was no donbt of the same opinion, when he appended to his extract

from Weddell's work a synopsis of all the known methods of determining the proportion of alkaloids; and I am much surprised how he, under these circumstances, could express some doubts whether my experiments perfectly agreed with Weddell's statements about the origin of the barks, which was scarcely possible. All my experiments refer only to commercial barks, by the names under which they occur in commerce, and I have described their physical characters. Weddell, on the other hand, had quite another object in view, namely, the origin of the barks; and he made no comparative chemical investigations of them. Nevertheless, he, like his predecessors, has left us in uncertainty about the origin of many commercial barks; for I can never persuade myself that Loxa bark and the woody Carthagena bark are derived from the same mother-plant, Cinchona Condaminea; and every one who knows and has chemically examined both barks, will perfectly agree with me.

We ought, therefore, while fully acknowledging Weddell's merits, not to overlook the difficulties of the subject. It would be unjust to expect that a traveller struggling with hardships of every kind should perform chemical experiments on the spot. This would be contrary to the purposes of so great an undertaking.

My object has hitherto been to arrange the commercial barks according to the specific proportion of alkaloid which they contain, as I have already done, in a small treatise.

There is indeed nothing that could materially obstruct such an arrangement, especially as by the discovery of the kinates, we are enabled easily to distinguish similar spurious barks from genuine ones, whilst every uncertainty may be removed by one single experiment. Discrepancies like that which Reigel has noticed with regard to the chemical constitution of Pitaya or bicolorata bark, depend on the mistaking of one bark for another, which frequently arises from the employment of erroneous names. The bark which Peretti examined as Cinchona bicolorata, cannot be identical with that whose alkaloid richness, Muratori determined. According to Peretti, and his experiments agree with mine, the bark which he examined, contained a peculiar, amorphous, uncrystallizable alkaloid (Peretti's *pittayin*) and is *decidedly no cinchona*.

As regards the testing of cinchona barks for the alkaloids, no notice has hitherto been taken of the proportion of kinovic acid, but as the very bitter taste of the spurious cinchona barks depends exclusively on this acid, and in some of the genuine barks kinovic acid is found, a mistake may be easily made by the taste. I have for several years past, devised and employed a method by which not only the proportion of the alkaloid, but also that of the kinovic acid may be quantitatively and qualitatively determined, whilst at the same time, the proportion of both kinic acid and oxidized tannin (cinchona red) is indicated. So that all those constituents of the bark, which are of importance for medical practice, are determined.

The barks tested by this method, yield, when employed for the manufacture of the alkaloid on a large scale, exactly the same quantity which they yield by the experiment, generally one-eighth to one-quarter per cent. more, the loss in working with large quantities being naturally less in proportion, and this indeed is the best proof of the efficiency of this method.

In the qualitative examination of cinchona barks, a number of tests have hitherto been employed, which have not only aided this examination, but have rendered it much more difficult.

The efficacy of the bark depends, as is well known, chiefly on the proportion of alkaloid, and of that of pure and oxidized cinchona-tannin. Of the kinovic acid, we only know that it does not act as a febrifuge. The medicinal virtues of kinic acid or kinate of lime have not yet been determined. We must, therefore, confine ourselves to the application of those tests by means of which these compounds can be detected in an infusion of bark, and their quantitative proportion at least approximatively determined. These are, as has been before stated in my monograph on genuine barks, as follows:—

1. *Tannin*, for detecting the alkaloids. The more abundant the precipitate produced by this reagent in the aqueous filtered infusion, the more alkaloid do the barks contain.

2. *Chloride of iron* determines the proportion of oxidized tannin by the more or less intensely dark-grey colouration, which speedily becomes brown, and by the subsequent more or less abundant pulverulent precipitate of a dark, dirty, brownish-green colour.

3. *Gelatine* (*solution of isinglass*), like chloride of iron, occasions the oxidized tannin to be precipitated. In the liquid filtered from the magma, the proportion of non-oxidized cinchona-tannin may be determined by iodic acid. The latter oxidizes the tannin, and causes the precipitation of a yellowish brown powder; the mixture soon smells of iodine. The quantities of these two precipitates show the proportion of oxidized and of pure cinchona-tannin.

4. *Sulphate of copper* is perfectly indifferent to the aqueous infusion of bark, which contains no kinovic acid, but indicates the smallest proportion of this acid by a dirtyish green colouration of the mixture, which is speedily followed by a similarly coloured fine powder, which is easily separated by the filter, and, after being washed, is distinctly recognized by its very bitter and metallic taste, as kinovate of copper. The more abundant this precipitate, the greater is the proportion of kinovic acid. All other reagents hitherto employed can be absolutely dispensed with.

Of all the hitherto known methods for the quantitative determination of the alkaloids, I prefer the following:—If the quantity of bark at command be large, it is necessary, in the first place, to ascertain whether it consist of one or of several sorts. An experienced eye can readily determine this. The several sorts should be separated, and, for experiment, not too small a quantity selected from the entire mass of the coated and uncoated of the coarser and finer barks, taking of each sort according to the various dimensions in which it is contained in the whole mass, about an equal weight. These pieces are to be finely powdered and the residue mixed with the powder. Of this powder 500 grs. or 1000 grs. are to be completely exhausted by digestion in the water-bath, with the necessary quantity of alcohol of eighty per cent. (I use six ounces of alcohol for 1000 grs. bark); the cold tincture is to be strained through a thin but close piece of linen, the residue washed with alcohol and again digested, and completely exhausted with half the weight of the first employed quantity of alcohol. The residue which is now obtained is to be once more exhausted by alcohol, then dried and preserved. (There is no occasion to spare the alcohol in this process, as the greater portion of it is recovered.) The united alcoholic tinctures are to be filtered and digested at the common temperature, with a mixture of equal parts by weight of recently prepared slacked lime and of crude well-burnt animal charcoal, of which in general half the weight of the employed bark is required. The mixture is to be frequently shaken, and the digestion continued until the supernatant liquid becomes perfectly decolourized. In the case of most of the genuine barks, this takes place in a short time; but the alcoholic tinctures of the spurious barks, which contain kinovic acid, as well as those which contain paricin, are very imperfectly decolourized by this process, a circumstance which serves to distinguish the paricin barks and spurious barks from the genuine ones.

The decolourized liquid is now to be removed from the residue, and the latter repeatedly shaken with small quantities of alcohol, washed on the filter with spirit of wine and dried. From the mixed filtered alcoholic tinctures the greater portion of the alcohol can be recovered by distillation in the water-bath. Beindorff's distillatory apparatus with Liebig's refrigerator is well adapted for this purpose—a similar and much cheaper apparatus can be constructed of tin. The whole quantity of alkaloid which was contained in the bark is now in the residue, and if the bark contained kinovic acid, in combination with the latter, and a peculiar fatty substance. Small proportions of oxidized tannin are frequently mechanically mixed with it. In order to purify the alkaloid of the latter and to remove the kinovic acid and fatty matter, the residue is to be placed in a small evaporating basin, the distilling vessel is to be washed with a small quantity of water, slightly acidulated with sulphuric acid, and the solution added to the residue. A small excess of diluted sulphuric acid is to be dropped into this mixture, which is to be heated, and when it again becomes cold is to be filtered, and by this means the precipitated kinovic acid and fatty matter are removed and washed with distilled water. From the filtered acid solution the alkaloid is to be thrown down by a slight excess of ammonia; and the mixture evaporated by a slight heat to dryness. The sulphate of ammonia contained in the cold residue is to be removed by a small quantity of very cold water, and the residual alkaloid dried and weighed in this impure state; for the perfect purification of small quantities is attended with too great a loss to admit of the exact determination of the quantity of alkaloid contained in small quantities of bark. After having

thus determined the weight of the alkaloid the further examination of it is proceeded with, the cinchonine and quinine are separated by ether, &c.

In order to determine the proportion of kinovic acid, dilute solution of ammonia is to be added to the yellowish, glutinous matter which adheres to the filter, and which is, for the most part, greasy to the touch. This takes up the kinovic acid but not the fat. The solution is to be filtered, and to it a slight excess of muriatic acid added to precipitate the kinovic acid, which is then to be collected on a filter. The well washed glutinous precipitate is to be removed whilst moist from the filter, and dried upon a watch-glass or porcelain capsule, and the weight of the thus obtained kinovic acid marked down. This, however, is only the larger portion of the quantity of kinovic acid actually obtained from the bark. A smaller portion of it is still contained, combined with lime, in the lime-residue which has been digested with the alcoholic tincture of bark. This kinovate of lime is very difficultly soluble in spirit of wine.

In order to obtain this smaller portion, the lime-residue, exhausted by alcohol, is to be dried and powdered, and then digested with cold distilled water. From the filtered liquid, which is almost as clear as water, the white and nearly pure kinovic acid is thrown down by a very slight excess of muriatic acid. It is then to be weighed, and the sum added to that before obtained. By the direct treatment of powdered bark with milk of lime, the whole quantity of kinovic acid can be extracted from the bark. Also for the quantitative determination of the acid it is advisable to weigh it in the imperfectly pure condition, the loss accompanying the purification being very considerable.

If the qualitative examination of the bark has shown that this substance contains none or only a small proportion of alkaloid, but a large quantity of kinovic acid, or the latter only, the bark is more appropriately first treated with diluted milk of lime, and the kinovic acid precipitated by muriatic acid, by which method the testing of the residue for a possibly slight proportion of alkaloid is considerably facilitated. The dry residue of lime is then exhausted by alcohol, like the powdered bark, &c. In this manner I obtained from sixteen ounces of bark, containing kinovic acid, one grain of cinchonine, besides a large quantity of kinovic acid. The last more important constituent of the bark, the kinic acid, is now easily obtained by exhausting the residue of the bark, which has been treated by alcohol, with cold distilled water, evaporating the filtered liquid and distilling it in a not too concentrated state with peroxide of manganese and moderately strong sulphuric acid; the least proportion of kinic acid in the liquid is soon indicated by the development and evolution of kinone, which takes place during this process; and the smallest quantity of the kinone, which is not distinctly perceptible by the smell, may be soon detected by the dark colour, which the distillate assumes upon the addition of a few drops of a solution of ammonia.

This method of testing barks is distinguished from others by its great simplicity, by the correctness of the results, and by the possibility of detecting and quantitatively determining in one succession, and with the same material, all the more important constituents of the bark; I consider it as the best method known, not because it originates with me, but because it is adapted for the present stage of our knowledge of the chemical composition of cinchona barks, and *is practical*. It may be objected that it is rather troublesome, but this ought not to be of any consideration if we can be but sure of a correct result.

In conclusion, I must observe, that my method, though chiefly adapted for testing genuine barks, can be advantageously applied for examining new and apparently spurious barks. The occurring phenomena will then safely guide the experienced operator. With the barks containing paricine, the separation of the alkaloid is made very difficult, by its forming with the cinchona red contained in the bark, compounds soluble in acids and alkalies, which can be decomposed only with great difficulty. I refer in this respect to my last treatise on the Production and the Chemical Condition of Paricine, in Buchner's *Repertorium.—Jahrbuch f. Pharm.*, Bd. xxv., III., Sept. 1852, p. 129.

USE OF COFFEE-LEAVES IN SUMATRA.

From the *Overland Singapore Free Press*, published Jan. 3, 1853, we extract the following letter signed "*An old Sumatran*," upon the use of coffee-leaves for the preparation of a beverage in the island of Sumatra. We briefly alluded in the *Pharmaceutical Journal* for June, 1852 (Vol. xi., p. 578), to a project for employing coffee-leaves in this country as a substitute for tea.

"In the *Singapore Free Press* of the 17th September last, are extracts from the *Colombo Observer*, by which it appears a patent has been taken out by Dr. Gardner (known to us by his travels in South America*) for preparing the coffee-leaf in a manner to afford a beverage like Tea, that is, by infusion, 'forming an agreeable, refreshing, and nutritive article of diet.'

"It may be interesting to Dr. Gardner, his friends, and the public in general to learn, that an infusion of the coffee-leaf is an article of universal consumption amongst the natives of this part of Sumatra; wherever coffee is grown the leaf has become one of the very few necessaries of life which the natives regard as indispensable.

"The coffee plant in a congenial soil and climate exhibits great luxuriance in its foliage, throwing out abundance of suckers and lateral stems, especially when from any cause the main stem is thrown out of the perpendicular, to which it is very liable from its great superincumbent weight compared with the hold of its roots in the ground. The native planters, availing themselves of this propensity, often give the plant a considerable inclination, not only to increase the foliage, but to obtain new fruit-bearing stems when the old ones become unproductive. It is also found desirable to limit the height of the plant by lopping off the top, to increase the produce and facilitate collecting it, and fresh sprouts in abundance are the certain consequence. These are so many causes of the development of a vegetation which becomes injurious to the quantity of the fruit or berry unless removed; and where this superabundant foliage can be converted into an article of consumption, as hitherto the case in Sumatra, the culture must become the more profitable, and it is clearly the interest of the planters of Ceylon to respond to the call of Dr. Gardner, and by supplying the leaf on reasonable terms, to assist in creating a demand for an article they have in abundance, and which for the want of that demand is of no value to them. It ought to be mentioned also, that the leaves which become ripe and yellow on the tree and fall off in the course of nature, contain the largest portion of extract and make the richest infusion, and I have no doubt, should the coffee-leaf ever come into general use, the ripe leaf will be collected with as much care as the ripe fruit.

"The mode of preparation by the natives is thus:—The ends of the branches and suckers with the leaves on, are taken from the tree and broken into lengths of from twelve to eighteen inches. These are arranged in the split of a stick or small bamboo, side by side, forming a truss in such a manner, that the leaves all appear on one side and the stalks on the other, the object of which is to secure equal roasting, the stalks being thus exposed to the fire together and the leaves together. The slit being tied up in two or three places, and a part of the stick or bamboo left as a handle, the truss is held over a fire without smoke, and kept moving about so as to roast the whole equally without burning, on the success of which operation the quality and flavour of the article much depends. When successfully roasted the raw vegetable taste is entirely dissipated, which is not the case if insufficiently done. When singed or overdone, the extract is destroyed and the aroma lost. When the fire is smoky, the flavour varies with the nature of the smoke. The stalks are roasted equally with the leaves, and are said to add fully as much to the strength of the infusion. By roasting, the whole becomes brittle, and is reduced to a coarse powder by rubbing between the hands. In this state it is ready for use, and the general mode of preparing the beverage is by infusion, as in the case of common tea.

"If the testimony of one who has been long personally accustomed to the use of an infusion of the coffee-leaf thus prepared, can be of any avail in recommending the

* It is Dr. John Gardner of London who exhibited prepared coffee-leaves at the Great Exhibition of 1851. Mr. George Gardner, late superintendent of the Botanical Garden at Peradenia, Ceylon, and author of *Travels in the Interior of Brazil*, died in Ceylon in March, 1849.—Ed. *Pharm. Journ.*

article to public notice, I freely offer mine in support of all that which Dr. Gardner's patent claims for it, viz., 'as forming an agreeable, refreshing, and nutritive article of diet.' While I find the use of infusion of the *berry* for a few days invariably to produce on me, as on many others, the effects of nervousness and bilious obstruction, I drink a strong infusion of the *leaf* daily with evident benefit to my health and strength. As a restorative on exhaustion from the severities of labour or of the weather, from heat or cold, or long exposure to rain, I know nothing superior to it. It has also the advantage of being a powerful disinfectant, so far as neutralizing fœtidity goes, and a solvent of the viscid fluids which obstruct the circulation, often to the extent of becoming laxative if taken in extra quantity. Of its nutritive power, no proof can be stronger than that it suspends hunger and enables the labouring man to pursue his work for hours after he would be otherwise unable. That it would soon become a most valuable article of diet amongst the labouring classes, and on ship-board particularly, if once brought into use, there can be no doubt. The coffee-tree can be grown to advantage for the leaf in the lowlands of every tropical country where the soil is sufficiently fertile, whilst it requires soil and climate to produce the fruit.

"Nothing appears in the *Free Press* on the mode of its preparation by Dr. Gardner, but I should think if roasted and pulverized, and packed in air-tight cases like tea, it would retain its strength and bear transporting to every part of the world; and as it soon fixes itself more strongly than either tea or coffee in the taste, it would soon become a more absolute necessary of life than either of those articles. In fact, I am acquainted with no tropical production capable of being rendered so great a blessing to mankind as the coffee-leaf, and as it would tend materially to the desuetude of ardent spirits and strong drinks, its introduction ought to have the support of every friend to the moral and material welfare of society."

Padang, 12th November, 1852.

ON THE PREPARATION OF GALLIC ACID FROM CHINESE GALL-NUTS.

BY DR. G. C. WITTSTEIN.

The low price of Chinese gall-nuts and the larger quantity of tannic acid which they contain, induced the author to employ them as a source of gallic acid. Having found as the result of repeated trials that of the two methods of preparation, viz., precipitating the aqueous decoction with sulphuric or hydrochloric acid, or allowing the powdered gall-nuts made into a paste with water to undergo a species of fermentation, the latter furnished a much larger product, he adopted this method, notwithstanding the length of time it requires. The first result was, however, unfavourable. At the end of six weeks he found that the mass had still a very astringent taste, the filtered liquid gave a copious precipitate with gelatine, and no crystals were formed on evaporation. The mass was therefore boiled with water and the clear liquor precipitated by sulphuric acid, by which means the gall-nuts yielded barely one-sixth of their weight of rather coloured gallic acid.

The author then refers to Strecker's researches, which have shown that tannic acid is a conjugate compound of gallic acid and sugar, and consequently that the production of the latter acid in a paste of gall-nuts and water is caused by a nitrogenous substance contained in them, which acts the part of a ferment and determines the breaking-up of the sugar into certain products, at the same time liberating the gallic acid. He is further of opinion that the non-formation of gallic acid from Chinese gall-nuts, when treated in this way, is owing to the absence of any substance capable of acting as a ferment; and there certainly does not appear to be any other reason why the tannic acid which they contain, identical* in every respect with that of oak-galls, should not likewise yield gallic acid by this process.

* Hitherto the identity of the tannic acid from these two sources has been inferred only from the correspondence of their physical and chemical characters; but Wittstein has found that the elementary composition is likewise the same. The tannic acid prepared from Chinese gall-nuts by extraction with ether in the ordinary manner, and dried at 130° F., gave, on combustion with oxide of copper alone, a quantity of hydrogen, which certainly agreed closely with the formula $C_{18}H_{18}O_{18}$ (=3.8 per cent.), but the quantity of carbon was so small in proportion to that

required by theory (=51.5 per cent.), that he concluded it could not have been perfectly burnt; and on repeating the analysis, introducing some fragments of fused chlorate of potash into the posterior part of the tube, so as to obtain a supply of oxygen at the close of the operation, he obtained from 0.445 grm. of the acid, dried at 130° F., 0.164 grm. water, =0.01822 or 4.09 per cent. hydrogen, and 0.832 grm. carbonic acid, =0.2269 or 50.99 per cent. carbon.

If this conjecture be in accordance with fact, it would follow that the production of gallic acid from the tannic acid of Chinese gall-nuts might be effected by this process, on the addition of a small quantity of ordinary galls, perhaps also on the addition of yeast; and experiment proved that this is really the case.

A quantity of Chinese galls mixed with one-eighth of its weight of ordinary galls, both in powder, was made into a paste with water, and left exposed in an open vessel at the ordinary temperature. At the end of three weeks, during which time the water was frequently renewed as it evaporated, the mass had no longer any astringent taste, the filtered liquor gave but a slight precipitate with gelatine solution, and on boiling it a quantity of beautifully white gallic acid was obtained, amounting to nearly half the weight of the gall-nuts employed.

Another quantity of Chinese galls in powder was mixed with one-eighth of yeast and left exposed in the same manner. The production of gallic acid was rather slower than in the last experiment, the astringent matter not disappearing entirely until the end of four weeks and a half, but the quantity yielded was not smaller.

It follows, from these experiments, that the present theoretical view of the production of gallic acid from tannic acid is incorrect. Wittstein considers that the absence of any sweet taste in the digested mass is a sufficient proof that the sugar has been decomposed—the question is, in what manner?

Pelouze regards the change as a partial oxidation, assuming that tannic acid takes up eight equivalents of oxygen from the atmosphere, which, combining with four equiv. of carbon, escape and leave two equiv. of gallic acid. Adopting the old formula for tannic acid, $C_{18}H_8O_{10}$, this may be represented by the following equation:

$$\left.\begin{matrix} C_{18}H_8O_{22} \\ O_8 \end{matrix}\right\} = \left\{\begin{matrix} 2 \text{ equiv. gallic acid} & \dots & C_{18}H_8O_{18} \\ 4 \text{ equiv. carbonic acid} & \dots & C_4\ \ O_8 \end{matrix}\right.$$
$$C_{18}H_8O_{30} \qquad\qquad C_{18}H_8O_{30}$$

An evolution of carbonic acid certainly takes place, but Wittstein shows that it is in no way connected with the influence of atmospheric oxygen, for the production of gallic acid takes place when a paste of gall-nuts is allowed to remain a sufficient time in a flask with a bent tube dipping under water. He further states that he has obtained alcohol in this way, thus proving that the change consists in a vinous fermentation of the sugar existing in tannic acid, and that it is from this source the carbonic acid originates. Braconnot long since observed, that powdered gall-nuts, moistened with water, suffered vinous fermentation; but this statement has not hitherto received the attention it deserved, because gall-nuts were found to contain no (free) sugar.

The author further expresses his opinion, that the absence of the necessary ferment, in sufficient quantity, is the only reason why an aqueous decoction of gall-nuts yield less gallic acid, and more slowly, than when the gall-nuts are made into a paste with water, the ferment being probably insoluble.—*Vierteljahresschrift für praktische Pharmacie*, Heft. I. 1853.

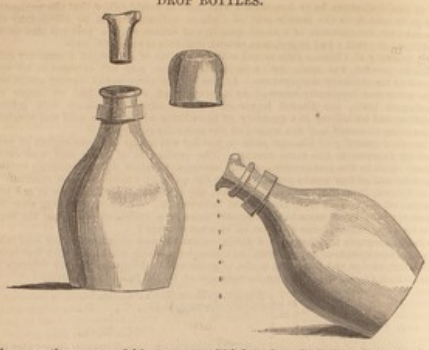
THE DOSE OF TINCTURE OF ACONITE.

(*From a Correspondent.*)

In the last number of the Pharmaceutical Journal you have very properly repeated your observations on the embarrassment and danger of there being several formulæ for *tinctura aconiti*. But I would in addition call your attention to the very various and conflicting opinions as to the dose in which the tincture ordered by the London College should be administered. You say that the dose is from one to five drops, and that eight drops have been known to produce rather alarming effects. But Mr. Squire gives the dose as from seven to ten *minims*; Mr. J. Denham Smith, in his translation of the *Pharmacopœia*, in one place, from two to ten minims, in another, from one to six minims; while Dr. Nevins actually states it to be from three to fifteen minims, "*or even more.*"

London, Feb. 22, 1853.

DROP BOTTLES.



Amongst the many useful instruments which have been devised for the determination of drops, a bottle, of which the annexed engraving is a representation, has been found to answer successfully in every respect. It consists of a decanter-shaped bottle of any convenient dimensions, into the neck of which is accurately fitted a hollow stopper, terminating at its upper extremity in two apertures, placed horizontally and parallel with each other. The whole is surmounted with a glass cap.

The bottle being filled with liquid, and the stopper inserted, the instrument is inclined sufficiently to allow the liquid to issue from the smaller aperture. A perfectly regular succession of drops of uniform size escapes, the air being at the same time admitted through the opposite aperture. The position of the bottle being reversed, a larger supply of liquor is obtained by means of the larger aperture of the stopper, whence it issues in a moderate and uniform stream.

The value of this instrument when used for volatile and ethereal liquids, hydrocyanic acid solutions, &c., becomes sufficiently obvious, the evaporation being almost entirely prevented, and accuracy of supply insured. Both for the preservation and use of test liquids, acids, &c. in the laboratory, and for tinctures, solutions, &c. at the dispensing counter, it is found to be an indispensable appendage.

63, *Piccadilly, Manchester.* George Dimond.

PROCESS FOR DETERMINING THE VALUE OF SOAP.

BY DR. BOLLEY.

To determine the value of a specimen of soap, it is necessary to ascertain,—1st. the percentage of dry substance; 2nd, the relative proportion of fatty acid and alkali; 3rd, the kind of alkali and fatty acid, or the substance replacing the latter; 4th, the intentional or accidental admixture of foreign organic or inorganic substances.

In most instances the consumer merely determines the percentage of water in soap, because this is the most usual and almost unavoidable admixture, and one which, as is known, may be present in a soap in considerable quantity, without in an equal degree influencing the exterior appearance, hardness, &c. The means of determining the percentage of dry substances are,—1st, drying a weighed quantity in a water-bath; and 2nd, salting out, or introducing the soap into a saturated solution of chloride of sodium and boiling, by which means it concretes together

into a solid mass tolerably free from water. With regard to the first method, many have no doubt found that when the soap has been heated for a long time in a water-bath, and has commenced to melt, it not only does not give off any more water, but becomes very hygroscopic, and attracts moisture again very rapidly.

Old Marseilles soap, exposed to a temperature of 86° F. for six hours, was found to have lost 3.2 per cent., and when kept at 212° F. for two hours, there was no farther diminution in weight; after exposure to the air for a few hours, it weighed one per cent. more than at first. Several other specimens showed that soap, when heated to 212° F., increased in weight during the weighing. If such experiments were carried out by inexperienced persons, errors would be the natural consequence. The process of salting out may be applicable upon a somewhat large scale, with for example a pound of soap, and is then better adapted than the other to give trustworthy indications of the percentage of actual soap. But the determination of dry soap has no bearing upon the very important question of the possible presence of adulterating substances, still less upon the second and third points mentioned above.

It is by no means difficult to determine the quantity of alkali and that of fat in a soap; but the operation is far more tedious and troublesome when it is at the same time requisite to ascertain whether the soap contains free alkali or fat, and the proportion of one or other to the fat and alkali in combination. Nevertheless this question may not generally be of great consequence, as both errors would scarcely be owing to a fraudulent intention, and their magnitude would be confined within a narrow limit. The uncombined alkali in hard (soda) soap may be determined by exposing the soap in fine shavings to the air, so that the alkali may absorb carbonic acid, treating it with strong alcohol, and examining the insoluble residue, which may contain other salts or insoluble substances, for alkali. A process recommended by Stöckhardt is less troublesome; it consists in adding to a hot concentrated solution of soap, bitartrate of potash until the fatty acids begin to separate. The larger the quantity of bitartrate requisite, the larger the quantity of free alkali. This is certainly a mere comparative test, applicable to the examination of a number of different specimens of soap. It is not improbable that unsaponified fat is sometimes present in soap. Dumas determines it by separating all the fat by means of hydrochloric acid, re-saponifying with baryta-water, and extracting the baryta-soap with alcohol, which dissolves only the unsaponified fat.

The process now to be described does not take into consideration the quantity of free and combined fat or alkali, but includes the estimation of all the four above-named conditions which determine the value of a soap, and is at the same time serviceable and easily carried out.

A gramme of the soap is weighed; hard soap in shavings; soft soap is weighed to *near* a gramme, because the addition and abstraction of small quantities is more inconvenient than a reduction in the calculation. The soap is introduced into a beaker-glass holding about an ounce, treated with a small quantity of æther, in which it does not dissolve, and then with a rather smaller volume of pure acetic acid; two layers are thus formed; the soap is rapidly dissolved; the upper layer containing the fat or rosin, with a little acetic acid; the lower layer water, alkali combined with acetic acid, free acetic acid, the salts usually formed in the manufacture of soap, chloride of sodium, alkaline sulphate, and finally the foreign admixtures, whether soluble in water or not. If sand, powdered pumice-stone, clay, steatite, heavy spar, &c., are present, they remain at the bottom of the glass. Other substances of organic origin, such as starch, &c., are suspended in the layer of liquid beneath the æther. The entire mass is then poured off from the undissolved substances in the beaker into a large pipette, widened in the middle and bent upwards at the lower extremity so as to form a kind of separator. The liquids are allowed to remain in the wide part of the pipette until they have perfectly separated into two layers, and it may then be so managed that none of the ætherial liquid enters its lower extremity, which is turned upwards. The beaker-glass, together with the residue, if any, is then washed with æther and water, which are poured into the pipette; and by inclining it, or blowing gently into the upper end, the liquids may be partially separated. The addition of successive quantities of distilled water will then wash the ætherial liquid perfectly free from saline matters. This being effected, the ætherial solution of fat, together with the small quantity of water beneath it, are poured back into the empty beaker-glass, and the pipette is washed out with a mixture of strong alcohol and æther. A great advantage is thus gained,

inasmuch as the small layer of water beneath the æther is rendered miscible with it by means of the alcohol; and if this is not the case at first, a few drops of alcohol must be added. It is for this reason advisable to avoid introducing too much water into the mixture when washing out the contents of the pipette into the beaker. It is also convenient to have the weight of the beaker marked upon it with a diamond. The ætherial liquid is then placed upon a water-bath, and left until nothing remains but the fat or resin, which, without altering the general principle of the process, may readily be recognized. When a trace of aqueous liquid remains beneath the fat, it is very difficult to remove it by evaporation, and the addition of alcohol to the æther is a very appropriate means of obviating this difficulty. When the smell of æther, alcohol, and acetic acid has become very feeble, the residue is weighed, and the weighing repeated after a longer-continued application of heat; it rarely happens that any decrease of weight is perceived on the second weighing, when the evaporation is carried far enough in the first instance. When several experiments are made successively with the same soap, the percentage of fat comes out in the several determinations agreeing in the second decimal place.

The fatty acid from one grm. of soap forms a layer of such thickness, that by slightly inclining the beaker-glass, the bulb of a small thermometer can be introduced, so as to determine the melting-point, by which means some idea may be formed of the kind of fat. If any insoluble residue remains in the beaker after the first treatment of the soap, it is dried and weighed, and its nature determined. The aqueous liquid which is separated from the ætherial solution of fat is introduced into a small capsule,* and carefully evaporated to dryness in a water-bath. The residue is weighed, and ought not to suffer any further diminution of weight when again heated in the bath. The presence of gelatine may be detected during evaporation by the appearance, starch by means of iodine solution, cheese-curd by the peculiar empyreumatic odour evolved on the application of a sufficient heat; other organic substances may likewise be readily detected. Their total quantity is estimated by the loss of weight on ignition. If the perfect clearness of the aqueous liquid, the small residue left on evaporation, and its radiated crystalline appearance, indicate that saline substances only are present, the residue may be ignited at once and a previous weighing dispensed with. In this case the ash should contain very little carbon, and after this has been perfectly burnt off, it may be examined to determine the quantity and kind of mineral substances it contains. Silica, if it has been added in the gelatinous form, will have become insoluble, and may be separated by filtration and weighed. The filtrate must be examined for sulphate of potash and chloride of sodium, and their quantity determined when there is reason to suppose that they are greater than could be accounted for merely by the impurity of the alkali used in the manufacture of the soap, or the introduction of chloride of sodium during the process. In case it is unnecessary to determine the admixtures named, the total percentage of alkali may be ascertained by treating the ignited residue with hydrochloric acid, evaporating to dryness, weighing, and calculating from the chloride of potassium or sodium the quantity of soda or potash. When it is necessary to ascertain whether besides soda there is potash present, or the reverse, this must be done according to the general rules of analysis, which it is not necessary to particularize here. The same remark applies to several other points. My object in the present instance is to furnish the Chemist with a short method of ascertaining the value of soap, leaving the detailed execution of it to his own management.

For the usual purpose, then, this method enables us to determine the percentage of fat† and its melting-point, the insoluble admixtures—sand, heavy spar, pumice-stone, &c. The loss on ignition gives approximatively the organic admixtures. The saline residue, converted into chlorine compounds, indicates the percentage of alkalies; in that from soda soaps, fifty-eight parts are equal to thirty-one soda; and in potash soaps, seventy-four chloride of potassium are equal to forty-seven potash. The sum of these constituents (in centigrammes) deducted from 100 gives the percentage of water.—*Chemical Gazette.*

* A platinum or silver capsule, two inches in diameter, with a cover, so that it can be used as an evaporating dish or crucible, is the most convenient.

† The percentage of fat comes out somewhat higher than it really is, since the fatty acids are separated in the hydrated state, while in combination with potash and soda they are anhydrous. This circumstance is generally overlooked in the examination of soap, because the high equivalents of the fatty acids render its influence slight.

ON THE DETERMINATION OF THE COMMERCIAL VALUE OF INDIGO.

Wittstein advocates the use of the deoxidation test proposed by Berzelius and Pugh, and considers that the discredit into which it has fallen is the result of unfounded prejudice. He further points out the several defects of the other modes of testing indigo. The use of sulphuric acid as a solvent of the blue colouring matter is objectionable; first, because it takes up other constituents of indigo, partly organic, and worthless as dyeing materials, partly inorganic; secondly, because there is no means of separating the indigo blue from the other dissolved substances. He considers the method proposed by Reinsch,* of determining the commercial value of indigo by observing the intensity of colour of the sulphuric acid solution at a certain definite point of dilution as of small value, inasmuch as it gives only relative results, and that with no very great accuracy. Of the actual percentage of blue colouring matter it gives no indication.

The use of chlorine he considers as still more open to objection; in the first place, because it furnishes only relative results, and in order to obtain absolute results, it must be ascertained how much chlorine a certain weight of pure indigo blue requires for its decolourization; secondly, commercial indigo contains various other organic substances, coloured and colourless, which likewise take up chlorine, consequently the percentage of indigo blue, calculated from the quantity of chlorine consumed, is always too high and requires correction, for it cannot safely be assumed that the chlorine acts first upon the indigo blue.

In order to obtain some positive data connected with the use of the chlorine test, Wittstein made some experiments to determine the quantity of chlorine requisite for the decolourization of a certain weight of pure indigo blue, assuming at the outset that this quantity was constant. He was, however, unable to arrive at any practically available results. He used the solution of indigo highly diluted; the operation was conducted in a long-necked flask, in order to avoid any interruption of the action by the renewal of water which had evaporated, and the solution of salt was added at regular intervals; notwithstanding all these precautions the quantities of chlorate of potash requisite to produce decolourization in several successive experiments were very unequal. He considers that these discrepancies are dependent upon circumstances with which we are not sufficiently acquainted; for instance, the duration of the process, a small quantity of salt producing as great an effect in a certain time, as a larger quantity in a less time; but when the reaction occupies too long a time the liquid becomes concentrated and the result impaired. The decolourization of weak solutions cannot be effected at the ordinary temperature, and concentrated solutions are decolourized at the ordinary temperature only after the lapse of some time; if they are employed at an elevated temperature the discrepancy in the results is increased still more.

Wittstein, therefore, comes to the conclusion, that the old reduction test should be again adopted, since it furnishes not merely relative, but absolute and tangible results, which, when a few precautions are taken, are very trustworthy. It is, moreover, easy to carry out, and does not occupy more than two days. He gives the following directions for its application:

Ten grains of indigo are rubbed with water in a porcelain mortar, to this twenty grains of hydrate of potash are added, together with a few drops of water, the rubbing being continued, and then forty grains of sulphate of iron, the mass mixed with water, so as to form a thick paste, and introduced into a six-ounce stoppered bottle, which has been previously weighed; the mortar should then be rinsed and the bottle nearly filled up with water. After inserting the stopper the whole is weighed and well shaken for some time. After the lapse of a few hours the indigo is decolourized and dissolved. The mixture is then allowed to settle, the clear liquid is poured into a glass cylinder as completely as possible, and the bottle again weighed. The clear liquid is then to be treated with hydrochloric acid, the blue precipitate collected upon a weighed filter, washed with water, dried and weighed. By means of a proportion it may be ascertained how much indigo blue is contained in the ten grains of indigo; if, for instance, the contents of the bottle weighed 3140 grains, the

* Jahrb. für prakt. Pharm. xviii. 248.

residue left on decantation, 535 grains, and the 2605 grains of clear liquor yielded 2.5 grains of indigo blue, then :—

$$2605 : 3140 = 2.5 : X$$
$$X = 3.01.$$

Consequently the indigo examined would contain 30.1 per cent. of pure colouring matter.— *Vierteljahresschrift für prakt. Pharmacie.*

ON THE CONSTITUTION OF COD-LIVER OIL.

Winckler draws the following conclusions from a series of experiments upon cod-liver oil:—By saponification with potash it is separated into oleic and margaric acids and oxide of propyl; with oxide of lead into oleic and margaric acids and a higher oxide of propyl, a new acid, propylic acid. It yields no glycerin on saponification, the glycyl $=C_6H_7$ being represented in cod-liver oil by propyl $=C_6H_7$. On heating the soaps of this oil with hydrate of lime and chloride of ammonium a concentrated solution of propylamin $=C_6H_9N$ distils over.* It is only in this oil that the conditions for the formation of propylamin, upon the introduction of ammonia, exist, consequently no other oil can be substituted for it as a medicinal agent, even when the minute quantity of iodine is not taken into account.—*Jahrbuch für prakt. Pharmacie*, xxv., 112.

ADULTERATION OF ARNICA LEAVES.

Zölffel states that he received from a drug dealer, under the name of Arnica, leaves which were altogether different from those of this plant. They were palmated, with five lobes, incised at the apices, and serrated, the teeth being ciliated. On closer examination they proved to be the leaves of *Astrantia major*.—*Archiv. der Pharmacie*, lxxi., 116.

ADULTERATION OF GUAIACUM WOOD.

Hubaut has found that guaiacum wood is mixed with the shavings of other woods. In order to detect the adulteration it is only necessary to take advantage of the behaviour of guaiacum wood towards oxydizing agents. If the wood is treated with a solution of chloride of lime it assumes a green colour within a few seconds, while other woods either retain their natural colour or are rendered paler, but never become green.—*Journ. de Pharm. et de Chim.*, 1851, xx., 425.

ON THE PREPARATION OF AMMONIO CHLORIDE OF IRON.

Graue states, that when this substance is prepared in sun light it always contains a little protochloride, which is not the case when prepared by the light of a lamp. He likewise states that it is better, instead of dissolving the chloride of ammonium in water, to rub it, in a perfectly dry state, with the solution of chloride of iron, after which it is dried at a gentle heat. This process occupies less time, and furnishes a very excellent preparation.—*Archiv. der Pharmacie*, December, 1852.

ON THE PRESENCE OF AMYGDALIN IN VARIOUS PLANTS.

Wicke has continued his previous investigations on this subject. He submitted the buds and bark of Sorbus aucuparia, S. hybrida, Amelanchier vulgaris, Cotoneaster vulgaris, and Prunus padus to distillation, and tested the distillate for hydrocyanic acid. This was done in the autumn in order to determine whether amygdalin was not formed until the process of vegetation commenced, or was stored up in the plant during the autumn. The results which he obtained were in favour of the latter view, and in this respect amygdalin behaves in a manner analogous to starch, with which it has the further peculiarity in common that it decreases in quantity during the period of growth. It would also appear as if the amygdalin of the amygdalaceæ and pomaceæ took some share in the formation of cells, a conjecture which is supported by the circumstance that the amygdalin in plants belonging to

* Vierteljahresschrift für praktische Pharmacie, Bd. i., 434.

these two groups is chiefly contained in the fruit kernels. On comparing the small quantity of buds which were employed for the experiments in the autumn with the far larger quantity of young shoots to which his previous communication referred, and estimating the quantities of hydrocyanic acid contained in the distillates in each case, the above conjecture becomes almost a certainty. The bark and buds of Prunus padus contain a much larger quantity of aetherial oil in the autumn than was found in his previous examination.—*Ann. der Chim. und Pharm.*, Bd. lxxxi., 241.

IMPROVEMENTS IN THE MANUFACTURE OF SULPHURIC ACID.

(*Specification of the Patent granted June* 24, 1852, *to Thomas Bell, of Don Alkali Works, South Shields.—Enrolment due December* 24, 1852.)

My invention consists, first, in applying currents of electricity in sulphuric acid chambers or apparatus, for the purpose of promoting the union of oxygen and sulphurous acid gas, thereby producing sulphuric acid, and effecting a saving of the nitre or nitric acid now used. Secondly, my invention consists in obtaining and applying continuous streams of ozone to act on sulphurous acid in the manufacture of sulphuric acid. And in order that my invention may be most fully understood and readily carried into effect, I will proceed to describe the means pursued by me.

In carrying out the first part of my invention, I prefer to employ electric currents obtained by means of jets of steam; but I do not confine myself thereto, as other sources of electricity may be resorted to. I employ an ordinary sulphuric acid chamber; and in place of, or in addition to the use of nitre or nitric acid, as heretofore employed, I obtain and apply streams of electricity. And I would state that the arrangement of apparatus for this purpose may be varied; but that which I believe to be the best consists of numerous jets of steam, such as are used in hydro-electric machines, preferring to use that known as Armstrong's, and such as are well understood. And I have used for a full-sized sulphuric acid chamber twenty-four jets of steam (of fifty pounds pressure in the boiler), passing through passages of about one-quarter of an inch diameter; and opposite thereto I employ a collector, having numerous small metal points, such collector consisting of an iron tube or rod of three-quarters of an inch diameter, such apparatus being similar to what is now well known, and, in itself, is not claimed by me. To the end of this collector I affix a bar or rod of lead, or other suitable metal, the end of which I pass into a glass pipe in connection with the chamber, and from the end of which rod the electricity streams, and through which pipe the sulphurous acid flows into the sulphuric acid chamber; by which means the sulphurous acid will be converted into sulphuric acid, and this without the necessity of employing nitre or nitric acid. At the same time, it may be remarked, that in place of wholly dispensing with the use of nitre or nitric acid, the streams of electricity may be used in conjunction with some nitre or nitric acid, in which case the quantity of nitre or nitric acid will be reduced in proportion to the employment of currents of electricity. Then, in place of introducing the end of the bar or rod of lead, or other suitable metal, into a glass pipe through which the sulphurous acid passes into the chamber, I introduced the end of such bar or rod of lead, or other suitable metal, into a separate pipe of glass, the outer end of which is stopped, or for the most part stopped, and the inner end opens into the sulphuric acid chamber. I would remark, that as steam is required within the sulphuric acid chamber, it will be desirable to introduce the same by jets, suitably arranged for obtaining electricity; but I would state that I have found that if all the jets be introduced into the chamber, the acid becomes too much diluted. I therefore recommend that only so many jets should be introduced into the chambers as will supply the necessary steam.

I will now describe the second part of my invention, and in doing so I would remark, that ozone is known to have the property of converting sulphurous acid into sulphuric acid. In the experiments, however, which have been resorted to, in ascertaining and illustrating this fact, several hand jars or vessels have been used; but in such experiments there has been no combination of apparatus fitted to produce ozone and sulphurous acid, and to generate sulphuric acid continuously. I do not, therefore, claim to have discovered the fact that sulphurous acid is converted into sulphuric acid by ozone, this part of my invention, consisting in arranging apparatus in such manner that ozone and sulphurous acid may be

continuously produced, and the sulphurous acid converted into sulphuric acid, the object being to obtain practical means of manufacturing sulphuric acid by the use of ozone. The means hereinafter described for procuring ozone are, I believe, the best for the purpose. I do not, however, confine myself thereto, as other means may be resorted to for preparing or producing ozone. In carrying out this part of my invention, I use an ordinary fixed sulphuric acid chamber, and, so far as my experience goes, I have found that ozone acts most advantageously when the temperature ranges between 60° and 70° Fah. Into the sulphuric acid chamber a continuous supply of sulphurous acid is caused to flow as heretofore; and my invention consists of supplying thereto ozone, continuously produced in any convenient manner, and allowed to flow from the apparatus as produced to combine with the continued supply of sulphurous acid; and the most convenient apparatus for, and means of obtaining a continuous production and evolution of ozone with which I am acquainted, are as follows:—I construct boxes or chambers of iron or earthenware, which I prefer to be about 16½ inches wide, 12 inches from front to back, and 26 inches high, from the upper part of which box or chamber proceeds a tube or pipe leading to the sulphuric acid chamber, of about 4½ inches diameter, by which the ozone, as it is produced, passes into the sulphuric acid chamber. About 8 inches from the bottom are two holes in front of each box, about three-eighths of an inch in diameter, and there is a tray or drawer, which is capable of being slided into an opening near the bottom, in which is placed several sticks of phosphorus immersed in water to the extent of about half their diameter. I have used twelve sticks, 7 inches long, and three-eighths to half an inch diameter, in each of such trays, and for a large sulphuric acid chamber, 200 feet × 19 × 16 feet, I have employed twelve such boxes or apparatus, and I have replaced the drawers with others having thereon fresh sticks of phosphorus, about every twelve hours, unless the phosphorus becomes inflamed, in which case I have changed the same earlier, and I do not use the same sticks of phosphorus again until they have been remoulded. By this arrangement I have been enabled to save a very considerable part of the nitre or nitric acid formerly used, and I am induced to imagine that the use of nitre and nitric acid may ultimately be wholly dispensed with in the manufacture of sulphuric acid; and I believe that it will be found advantageous to pass the sulphurous acid and the ozone into a column filled with coke, pumice-stone, or other suitable material, before they pass into the sulphuric acid chamber. The sulphurous acid I obtain by burning sulphur or matters containing sulphur as heretofore practised when using nitre or nitric acid only.

Having thus described the exact apparatus and means of obtaining and applying ozone used by me, I wish it to be understood that I do not confine myself thereto, as the same may be varied, or other arrangements of apparatus and means of obtaining and applying ozone may be resorted to in carrying out my invention, so long as a supply of ozone is kept up to convert the continued fresh supply of sulphurous acid into sulphuric acid. And I would have it understood that what I claim is, first, applying currents of electricity in sulphuric acid chambers or apparatus, thereby promoting the union of oxygen and sulphurous acid; and, secondly, I claim the obtaining and applying ozone to act on a continued production of sulphurous acid in the manufacture of sulphuric acid.

(Signed) THOMAS BELL.

IMPROVEMENTS IN THE PREPARATION OF GUTTA PERCHA.

(*Rider's Patent, enrolled Jan.* 20.)

THE chemical part of this patent relates to the vulcanization of gutta percha by means of the hyposulphites of lead or zinc, the process being conducted in the same way as in the vulcanization of India-rubber. In vulcanizing gutta percha, the patentee directs that the oleaginous, watery, and other volatilizable matters contained in that material, should be expelled by means of heat, in order to render it capable of undergoing the process of vulcanization or union with sulphur or its compounds. For this purpose the heat need not, as a general rule, exceed 400° to 500° Fah., and in some cases, 300° will be found sufficient; all that is required being to drive off the volatilizable matters, and bring the gutta percha to a doughy consistence.

[With the advantages arising from the vulcanization of India rubber we are now become well acquainted in the numerous practical applications of that material to useful purposes in the arts and manufactures. By means of this process of vulcanization, not only is the elastic power of the India-rubber greatly increased, but also its capability of bearing high temperatures without undergoing decomposition; it is also rendered insoluble in oils, coal naphtha, and turpentine, all of which more or less powerfully act on India-rubber in an unvulcanized state. These advantages naturally led to attempts to vulcanize gutta percha; these endeavours, we believe, have not hitherto been successful. If by Mr. Rider's process the vulcanization of gutta percha be now rendered practicable, the useful applications of that material will be still more extensive.]

IMPROVEMENTS IN THE MANUFACTURE OF COAL GAS.

(*Kirkham's Patent, enrolled Jan.* 22.)

THE chemical part of this patent consists in purifying the gas by means of the subchloride or oxichloride of antimony, which is used either in a dry or damp state, as in the process employed for purification by means of lime. The subchloride of antimony may be obtained by boiling sulphuret of antimony in muriatic acid, and precipitating by the addition of water.

IMPROVEMENTS IN THE MANUFACTURE OF SUGAR.

(*Egan's Patent, enrolled Jan.* 20.)

THE chemical part of this patent has reference to the defecation of cane-juice, and consists of the employment of a mixture composed of seven pounds of lime, ten gallons of plantain juice, with the further addition of one ounce of flowers of sulphur to each six gallons of the mixture. From two to three quarts of this mixture are to be added to the boiling cane-juice after the first scum has been thrown up and removed. A complete defecation of the saccharine solution is thus effected.

IMPROVEMENTS IN REFINING SUGAR.

(*Bessemer's Patent, enrolled Jan.* 24.)

THE specification of this patent is chiefly devoted to a description of various mechanical improvements introduced by the patentee into the manufacture and refining of sugar. The only part which comes within our province is his mode of treating and combining albuminous matters with charcoal to be used in the refining of sugar. The albuminous substances, such as white of eggs, blood, &c., are evaporated almost to dryness at a low temperature, animal charcoal in powder is then mixed with them, and the whole having been well incorporated is moulded into bricks, in which state they may be exported from this country to the sugar-producing colonies, continuing in good condition for a considerable period. When required for use, these bricks are reduced to powder and diffused through warm water.

CHEMICAL SOCIETY.

December 20th, 1852.

DR. DAUBENY, PRESIDENT, IN THE CHAIR.

ON THE LAW OF ELECTROLYSIS.

BY PROFESSOR H. BUFF.

THE law of definite electrolytic decomposition, as announced by Faraday, having been denied or doubted by many Physicists, and Faraday himself having admitted that very weak currents of electricity may possibly be conducted by fluid electrolytes unaccompanied by decomposition, a further investigation of the subject was undertaken by the author. His first object was to construct a battery which should give a weak but perfectly constant current for several days, a result which none of the known forms of battery would realize. This object he found to be pretty com-

pletely fulfilled by a slight modification of Daniell's battery, and this arrangement, which is fully described, was used in his experiments. From the results obtained, he considers the law of definite electrolytic decomposition to be proved, not only as affirmed by Faraday, when the current is of a certain strength, but even in regard to the weakest current; and he concludes that whenever deviations from the law have been observed, they have arisen from local actions, which it is sometimes difficult, if not impossible, to obviate.

February 7th, 1853.

COL. PHILIP YORKE, VICE-PRESIDENT, IN THE CHAIR.

ON THE MODE OF ESTIMATING THE VALUE OF RED PRUSSIATE OF POTASH, AND OF TESTING THE STRENGTH OF BLEACHING LIQUORS.

BY FRANCIS LIEBHIG.

1. For the estimation of red prussiate of potash the author recommends the use of sulpharseniate of sodium, which is easily prepared either by dissolving pentasulphide of arsenic in liquid sulphide of sodium, or by dissolving arsenious acid in boiling caustic soda, and adding from time to time a concentrated solution of sulphur in caustic soda, until they cause no further precipitation of sulphur. Pale yellow crystals are formed on the cooling of the filtered solution, and these are to be purified by re-crystallization, until they dissolve without residue. The composition of this salt is represented by the formula 3 Na S, As S_5 + 15 HO. It may be kept in solution for a considerable length of time, without undergoing decomposition, especially when mixed with pure carbonate of soda or potash. It is decomposed by all acids, by chlorine, and by red prussiate of potash.

When a solution of red prussiate of potash is mixed with a solution of the sulpharseniate, a decomposition takes place, in which it is probable that 3 equivs. of ferricyanide of potassium take 3 equivs. of sodium from an equivalent of sulpharseniate of sodium, setting free 3 equivs. of sulphur and 1 equiv. of pentasulphide of arsenic, and forming 6 equivs. of ferrocyanide of potassium, in which 3 equivs. of potassium are replaced by 3 equivs. of sodium. If, however, the sulpharseniate has been made alkaline by the previous addition of carbonate of soda, 3 further equivalents of sodium will be derived from this source, which will convert another 3 equivs. of ferricyanide into ferrocyanide.

Assuming thus, that 6 equivs. of red prussiate of potash would be converted into 12 equivs. of yellow prussiate of potash by the action of 1 equiv. of sulpharseniate of sodium and 3 equivs. of soda, calculation would show that for every 100 grs. of pure red prussiate of potash 20 grs. of crystallized sulpharseniate of sodium are required, and this is the exact proportion which has been found by experiment to be required.

In conducting the process for the estimation of red prussiate of potash, 100 grs. of this salt are dissolved in two ounces of water, and a separate solution of 20 grs. of sulpharseniate of sodium, together with 40 or 60 grs. of pure carbonate of soda or potash, in 400 measures of water, is made, and introduced into an alkalimeter tube. Each measure will thus contain one-twentieth of a grain of the sulpharseniate, and will indicate one-fourth per cent. of pure red prussiate. The mixture, as the decomposition takes place, acquires a pure white colour, and when this has been attained, the liquor is tested with a decoction of cochineal, which, on being added, is decolourized if the transformation of the red prussiate has not been completed; but when the transformation is complete the cochineal colour is imparted to the solution.

2. For estimating the strength of bleaching powder, and bleaching liquors, the author states that a solution of sulpharseniate of sodium might be used, but he prefers using a solution of arsenious acid in solution of carbonate of soda with excess of the latter. This solution is used with decoction of cochineal as in the other case.

69.78 grs. of pure arsenious acid, corresponding to 50 grs. of chlorine, are dissolved with half an ounce of carbonate of potash in 200 measures of water and put into an alkalimeter tube. Each measure will thus correspond with $\frac{1}{4}$ gr. of chlorine.

On the other hand 100 grs. of dry chloride of lime are mixed with 6 or 8 ozs. of water, and to this the test liquor is added until decoction of cochineal ceases to be decolourized.

INSTRUCTIONS IN PRACTICAL PHARMACY, EDINBURGH.

Mr. Theodore Roeding, Pharmacien from Hamburgh, has announced to the Pharmaceutical profession, that he intends to open Classes for Practical Pharmacy, suited for Assistants and Apprentices to Chemists and Druggists. These Instructions will treat of—1st. The Methods of Manipulation and Principles of Dispensing Medicines; 2d. Pharmaceutical Preparations; 3d. Chemical Combinations; 4th. Characteristics of genuine Drugs, with the best Methods for detecting Adulterations; 5th. Tests for Poisons. Pupils will make the experiments under Mr. Roeding's guidance, who will furnish them with the necessary formulæ. The possible Adulteration of Pharmaceutical and Chemical preparations will be pointed out, and the Tests for their purity given.

Mr. Roeding proposes to open two distinct Classes; one, called the Senior, for Assistants; the other, the Junior, for Apprentices—both Courses to extend over three months; the Senior Class to meet on Tuesdays and Fridays, and the Junior Class on Mondays and Thursdays, from a quarter past nine to a quarter past ten o'clock in the evening. The former to commence on Tuesday, the 1st of March, and the latter on Thursday, the 3d of March. Professor Christison's *Dispensatory* will be taken as the Text Book. Tickets: Senior Class, £1 1s.; Junior Class, 15s.; both Classes, when taken together, £1 11s. 6d.

37, *George Street.*

"The Committee of the Pharmaceutical Society in Edinburgh recommend the above Practical Courses to the attention of Assistants and Apprentices, and urge their attendance upon the same."

Edinburgh, 5th February, 1853. John Mackay, *Sec.*

BOARD OF EXAMINERS, EDINBURGH.

The Board of Examiners for Scotland will hold their next Meeting on Wednesday, 6th April, 1853, in the Society's Rooms, 72, Princes Street.

Candidates for Examination are requested to communicate with the Secretary, 121, George Street, Edinburgh, a few days previous to the day of meeting, and to transmit such testimonials or certificates as they may wish the Board to inspect.

Edinburgh, February, 1853. John Mackay, *Sec.*

BOOKS RECEIVED.

Observations on the Magnetic Force. By Professor Faraday.

Handbook of Chemistry, Vol. vii. Organic Chemistry, vol. i. By Leopold Gmelin. Translated by Henry Watts, B.A., F.C.S. London: Printed for the Cavendish Society. 1852.

The Farmer's Manual of Agricultural Chemistry, *with Instructions respecting the Diseases of Cereals, and the Destruction of the Insects which are injurious to those Plants.* By A. Normandy. Illustrated by numerous wood-engravings. London: Published by George Knight and Sons, Foster Lane, Cheapside. 1853. 8vo, pp. 218.

TO CORRESPONDENTS.

The List of Members and Associates.—We have received a long list of Members and Associates, recently elected, but it arrived too late for insertion this month. We understand the cause of delay was, the circumstance that some of the parties have not yet paid their subscriptions; and as no name is published until the subscription is paid, the Secretary, expecting remittances, deferred sending the list rather longer than usual.

An Assistant (Tunbridge Wells).—(1.) Those who have neglected to pass the classical examination at the proper time are required to do so when they pass the minor examination. (2.) Balfour's *Class Book* is a good work.

Chemicus (Southampton)—whose communication should have been noticed last month, complains that injustice is done to the Members of the Society by the assumption of the name and insignia of membership by those who have no connexion with the Society, and he thinks such encroachments ought to be prevented.

[The assumption of which he complains is contrary to law; and any person, not a member, exhibiting a certificate, purporting to be a certificate of membership, is liable to a prosecution for misdemeanour, if reported to the Council.]

"*Adjutor*"—(Leicester).—(1.) It would depend on the ability and industry of the individual.—(2.) The third Tuesday in the month, 11 A.M.—(3.) The certificates referred to would have no weight.

An Apprentice (Leicester).—Horace and Virgil are not at present introduced in the classical examination of the Society.

Cyanogen.—It has been remarked that the last dose of a mixture containing hydrocyanic acid is not so strong as the first. This may be the case from partial decomposition of the acid by exposure to light, and to a small extent from the diffusion of a portion of the acid into the upper part of the bottle. The bottle should be shaken.

The Phosphorus Disease.—We have deferred the publication of the case of phosphorus disease, which, with the chemical report, will come before an early meeting of the Society, when the portion of the jaw will be exhibited.

H. M. (Birkenhead).—Arrangements have been made for the completion of the remaining portion of Dr. Pereira's *Materia Medica*, respecting which we shall give further information when we have received authority.

W. D. (Loughboro').—The private receipt book of any perfumer who will allow it to be seen.

J. W. T. (Barnstaple).—Peat charcoal will absorb some of the ingredients of gas liquor, which are useful as manure; but we think it would be more economical to purchase these constituents in substance.

A Constant Reader.—"Compo," commonly called Roman cement, is made by calcining a reniform limestone (Septaria), which is found in the Isles of Sheppy and Thanet, and other places.

Alpha (Exeter).—Kilogramme 32 oz., 1dr., and 14 grs., troy
Gramme ... 15½ grains.

W. M. (Birmingham).—Tinctura Opii.—The directions in the *London Pharmacopœia* are—"Macerate for seven days; then press, and strain." It is not intended that any deficiency in measure, after straining, should be made up by the addition of more spirit. When the process of percolation is adopted, the whole of the tincture may be obtained, otherwise some portion is always lost, being absorbed by the residuum.

P. S. L. (Warrington) should apply to the Secretary, 17, Bloomsbury Square.

An Associate (Newbury).—Next month.

B. H. (Andover).—We are unable to give the information required respecting the "Beckeley Vale Cattle Saver."

A New Subscriber (near Manchester).—(1.) We do not recommend Works on the practice of Medicine and Surgery. (2) Mohr and Redwood's *Practical Pharmacy*, published by Taylor, Walton, and Co., 12*s. 6d.*

A. W. (Richmond).—See page 313 of the January number.

Chemicus (Spilsby).—(1.) See page 314 of the January number.—(2.) We are not acquainted with the formula for Lt. James's Blister for Horses.—(3.) Chloric æther is a mixture of chloroform with about four or five parts of rectified spirit.

A. S.—(1.) No.—(2.) No.—(3.) Yes.—(4.) In some cases.—(5.) It depends on circumstances.—(6.) Consult a medical man.

ERRATUM.—At page 386 of our last number, 13 lines from top, *for* Sjibul, *read* Gibul.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. CHURCHILL, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XII.—No. X.—APRIL 1st, 1853.

THE REVISION OF THE BYE-LAWS OF THE PHARMACEUTICAL SOCIETY.

As the existing bye-laws will continue in force only until the next Annual General Meeting in May, after which time all bye-laws will require confirmation by a Special General Meeting of the Society and by one of her Majesty's Principal Secretaries of State, a careful revision of these laws has become necessary. A committee has been for several months engaged in this revision, assisted by Mr. Brace, the legal adviser of the Society, and a draft of the proposed new code of bye-laws was presented to the Council on the 2nd of March. The draft having been, with some trifling amendments, approved by the Council, was referred back to the committee, with authority to have the same settled by Mr. Tidd Pratt, and to ascertain, if possible, the opinion of the Secretary of State with reference to approval.

We abstained in our last number from any comments on the proposed bye-laws, which would have been premature and irregular, as the labours of the committee were not at that time concluded, and the draft had not been submitted to the Council. In the few remarks we are about to make it must be understood that we refer to the draft as at present approved by the Council, but subject to the consideration and approval of the Members of the Society and the Secretary of State.

At the first consultation with Mr. Tidd Pratt, a question arose respecting the mode of conducting the next election of Council and Auditors, the Act providing that the voting-papers of Members residing more than five miles from the Post Office, St. Martin's-le-Grand, should be received at such elections, and that the form of the voting papers should be defined in the bye-laws. It was the opinion of Mr. Tidd Pratt that in order to ensure the requisite confirmation of the bye-law containing the form of voting paper in time to bring it into operation at the next election, it was necessary to hold a Special General Meeting as early as possible, at which the said bye-law should be confirmed, and that the confirmation by the Secretary of State should be obtained in time to admit of the issuing of the voting papers in accordance with the terms of such bye-law. A Special General Meeting has therefore been convened for Wednesday, the 6th of April (of which a notice will be found in the Transactions of the Society, page 464), at which meeting the form of voting paper will be submitted for confirmation. No other business will be transacted at that meeting.

In the meantime the revision of the proposed bye-laws by Mr. Tidd Pratt is progressing, and the result will be laid before the Secretary of State as early as possible, with a view of obtaining his sanction on or about the day of the Special General Meeting, at which the bye-laws will be before the Members for approval. The importance of this arrangement is obvious, as the Society will be without bye-laws on the day of the next Annual General Meeting, unless measures be taken to bring the new code into force at that time.

We believe it is the intention of the Council, as soon as the report of Mr.

Tidd Pratt has been received, to forward to each Member a copy of the proposed bye-laws.

On entering upon the consideration of this important and rather intricate subject it should be borne in mind that it is the object of the bye-laws to carry out in detail the principles laid down in the Charter of Incorporation and the Pharmacy Act—to fix the rate of subscription and the amount of fees—to define so far as may be deemed necessary, the duties of the several officers of the Society, the regulations respecting the examinations, the holding of meetings, and in general terms the mode in which the business of the Society is to be conducted. The bye-laws must not be in any respect repugnant to the principles of the Charter or the Act—they can confer no additional powers, but may limit and define the powers given or implied in the Act or Charter, such limitation and definition being consistent with the general scope of the law which the bye-laws are designed to elucidate and expound. When passed and duly confirmed, the bye-laws are as binding upon those whom they concern, as the Act or Charter under which they were framed. It is, therefore, inexpedient unnecessarily to tie the hands of the executive by entering too minutely into minor details which might safely be left to the discretion of the Council to be regulated as from time to time they may think right. It is policy to invest in the managers for the time being, ample powers for conducting the affairs of the Society with vigour and promptitude, and at the same time to define the method of proceeding in such a manner as to ensure consistency and regularity in the transaction of the business of the Society. In drawing this line the exercise of sound judgement is required, hence the importance of the provision in the Pharmacy Act, which subjects the bye-laws to two ordeals for confirmation after they have been framed and adopted by the Council. According to this provision three controlling powers are brought into requisition in passing a bye-law, all equally concerned in promoting the welfare of the Society, but each viewing it under a different aspect. The Members naturally consider their own individual interest—the Council the interest of the Society—the Secretary of State the interest of the public. These interests are mutually dependent on each other, and each being specially represented, the equilibrium is likely to be preserved. For example, a proposal to reduce the subscriptions fifty per cent. might *prima facie* be popular among the Members, but the Council would first calculate the effect of such a measure on the stability of the Society, and would not assent to it unless convinced that it could safely be adopted. Other measures might be considered politic and desirable by the Council as well as the Members at large, but objected to by the Secretary of State on some public grounds. The Council, whose duty it is in the first instance to frame the bye-laws, knowing the ordeals through which they will have to pass, are obliged to weigh carefully the chances of approval or dissent on either side, and thus the salutary check afforded by the two subsequent confirmations, operates indirectly from the time the Council enter upon the subject, and we may state that during the deliberations of the Committee, several questions have arisen in which these considerations have influenced the decision.

In framing a code of laws for the regulation of a Society, it is difficult to arrive at unanimity among all the parties concerned. Slight differences of opinion may arise on questions of minor importance, or with regard to the phraseology, and a mutual concession is necessary by way of compromise. Even on questions involving a principle, opinions may differ; and in this case the advocates on each side should advance calmly and dispassionately the arguments on which their opinions are founded; and if it should be necessary to put the question to the vote, the minority should bow to the decision of the majority. It is of the greatest importance that we should agree among ourselves before application is made to the Secretary of State for the confirmation of the result, and whatever may have been the prejudices or bias of

individual Members during the discussion these should merge in the decision of the collective body. These remarks apply especially to the present occasion as the question before us is an extensive and complicated one, involving as it does an entire code of bye-laws; and it is particularly desirable that the Society should come forward with an earnest and harmonious appeal to the government for support in the important step of bringing the Pharmacy Act into complete and effective operation.

It will be observed that in the first section of the bye-laws, under the head "Qualification, Admission of Members, Subscriptions, and Fees," some complication exists in reference to the several classes of Members, according to the period of their admission. This is unavoidable on account of the proposed change in the mode of levying contributions for the support of the Society. It is necessary to frame any new regulations on this subject in such a manner as not to interfere with the existing rights and privileges of those who have already joined the Society. Those who have been admitted under certain conditions, might have reason to complain of a breach of faith if called upon to subscribe to new regulations at variance with the understanding with which they originally entered. This is further explained in the following remarks on

THE FINANCIAL RESOURCES OF THE PHARMACEUTICAL SOCIETY.

The Pharmaceutical Society was originally supported almost entirely by annual subscriptions, for although the Members had the option of compounding for Life Membership on the usual terms—namely, ten years' purchase—a very small number availed themselves of this regulation. An income dependent on voluntary annual subscriptions is in all societies precarious and liable to fluctuation. In the case of the Pharmaceutical Society it was objectionable on other grounds, and although it was adopted in the first instance as a matter of necessity, we have always looked forward to the time when it might be found practicable to substitute a more satisfactory arrangement.

Experience has shown, that with regard to the future Members of the Society this has become absolutely necessary, and must be provided for in the new bye-laws, which will shortly be submitted to the Members for approval. An original Member, whose qualifications have been taken for granted, on the ground of his previous standing in the business, and who has been admitted to the rank of membership on the condition of his contributing his quota to the funds of the Society, can only retain this rank upon the condition on which he was admitted. But a Member who has been admitted by examination has acquired a rank founded on mental qualification which cannot be taken from him even if he should fail to pay his subscription. He may forfeit the personal privileges of membership, but his status rests chiefly on the certificate of the Board of Examiners. When an original Member secedes, the Society merely loses his pecuniary contribution. In the other case it loses in addition the influence derivable from superior qualification in its Members. While, therefore, the original Members are more and more interested in retaining their connexion with the Society as it rises in character and importance, the examined Members are held by a less obvious tie, as their certificate of examination gives them a rank equivalent, or nearly so, to that conferred by a certificate of membership. But it is necessary, in order to secure the permanence of the Society, that all should contribute to its funds; and it is especially important that those who have been examined should continue on the list of Members, and by their superior qualification raise the character of the body to which they belong. To secure this object it is proposed in future to substitute registration fees for the annual subscription, as follows:

	£	s.
Registration Fee on passing the Classical Examination	2	2
Ditto, on passing the Minor Examination	3	3
On passing the Major Examination, and Registration as a Pharmaceutical Chemist	5	5
On admission as a Life Member	5	5
Total sum payable by a Life Member	£15	15

This scale of fees is applicable to *future Members* who join the Society in the manner defined in the 10th clause of the Pharmacy Act, but it will not apply to those who have already joined it on the terms prescribed in the present bye-laws.

The terms for Members admitted before the next Annual Meeting in May, are as at present, one guinea* annually, subject to the option of paying a composition of ten guineas for Life Membership. Associates and Registered Apprentices of the present time, will, on becoming Members, be subject to the same regulations; and Members admitted under the new bye-laws, will in addition pay an entrance fee of two guineas. Associates and Apprentices of the present time will continue their annual subscription of half-a-guinea. Those admitted after the new bye-laws have come in force, will pay the fees above stated, in lieu of the annual subscription. This scale of fees and subscriptions has been adopted by the Council after much deliberation, and with a desire to reduce the amount as low as possible without placing in jeopardy the stability of the Society. It is impossible to form a correct estimate of the future income of the Society under the proposed arrangement, as this will be influenced by several contingencies—such as, for example, the number of Members who compound for Life Membership by the payment of ten guineas; the number of deaths and secessions from the Society; the number who will pass the several examinations in the course of the year, &c., on which subjects we have no data enabling us to found a calculation. We are not apprehensive of the secession of Members to any considerable extent, but if a large proportion of those now in the Society should become Life Members, this would reduce the income from that source about 70 per cent., as the annual subscriptions of 100 Members are 100 guineas, while the interest on 1000 guineas (the amount of the composition) is about 30 guineas. We must be prepared for a gradual reduction of the income from annual subscriptions, and an increase of the income from fees, and it being expedient that a certain proportion of the latter should be added to capital, it will be necessary to consider maturely what amount can be spared for this purpose, leaving a balance sufficient for current expenses.

On the supposition that all the present Members will continue their connexion with the Society, that not more than half the number will become Life Members, and that the number who pass the several examinations will not be less than it has been during the past year, we have every reason to expect that the income of the Society will be such as to admit of the investment of a large proportion of the amount of the examination fees. It would not, however, in our opinion, be safe to reduce the scale of fees and subscriptions below that which is now proposed, as prudence demands that provision should be made for securing a permanent fund, and that in the estimate of ways and means a discount should be taken off the apparent assets to allow for casualties.

A Society crippled in its finances, involved in debt, and with an income insufficient to maintain its position, possesses no attraction and can enjoy but little vitality. By parsimony and retrenchment its dissolution may be averted for a time, but the sphere of its usefulness is contracted, its Members are

* It is proposed to equalize the Subcription of London and Country Members.

ashamed of it, and it contains within itself the elements of decay. But let it be known that a Society is rich—that it has a large funded capital, a flourishing income, and a well-appointed establishment—that its operations are conducted with spirit, and that its Members are united in the determination to sustain its character and extend its influence—such a Society is an object of attraction. Its Members feel an honest pride in promoting its prosperity, and fresh supporters flock round it, eager to participate in the credit and advantages of being identified with so thriving an institution.

In this latter position we hope to see the Pharmaceutical Society in the course of a few years. The early difficulties attending its establishment are surmounted, the opposition from without is overcome, the Society is recognized and invested with important powers, and its future fate is in the hands of the Members.

There are some persons who are endeavouring to persuade the Members that, having been registered as Pharmaceutical Chemists under the Pharmacy Act, they need not continue their subscriptions. If all the Members were to follow this advice, the Society would cease to exist for want of funds, and registration in the books of a defunct Society would be a mockery. But it is not the fact that the obligation to contribute to the Society ceases with the registration. The Council is empowered to make such registers as may be required for giving effect to the bye-laws of the Society and to the provisions of the Act. The Charter and the Act lay down the principle that the privileges of membership and registration shall be conditional upon the payment of such fees or subscriptions as shall be fixed by the bye-laws. These payments are made either in one sum or in annual subscriptions. In the former case the name of the Member is placed on the permanent register; in the latter, on the annual register, which is in force during the current year, and renewable on the renewal of the annual fee or subscription. It is only fair, that all who enjoy privileges under a Society should contribute to its finances. This position is not disputed, but it has been asserted, that for want of a specific provision in the Act in reference to defaulters, the Council does not possess the power to erase from the register, or omit from future registers, the name of a person once registered as a Pharmaceutical Chemist. The new bye-laws will regulate this as well as other matters of detail, in a manner consistent with the principles of the Charter and the Act, and the powers therein contained, and we do not believe for a moment that the Members will be misled by the sophistry of the arguments advanced in favour of the discontinuance of their connexion with the Society.

A similar evasion of a just payment has been attempted occasionally by persons who have joined the Society solely for the purpose of obtaining the Certificate of Membership, which they have retained in defiance of the bye-laws, and continued illegally to exhibit it after they had ceased to be Members. The Council had no remedy but a court of law, to which they did not deem it expedient to resort under the then existing circumstances of the Society; but the 16th clause of the Pharmacy Act provides an easy remedy by summary process, as it enacts that every person so offending shall be adjudged guilty of a misdemeanor.

THE ADMISSION OF MEMBERS.

We take this opportunity of reminding the local secretaries, and those who may desire to join the Pharmaceutical Society under the new bye-laws, that the applications for admission must be forwarded to the Secretary not later than the 1st of May.

MEMORIALS TO THE LATE DR. PEREIRA.

In our last number we inserted the Prospectus and Report of a committee appointed for the purpose of raising subscriptions for a bust of Dr. Pereira, to be placed in the London Hospital, and a portrait to be distributed among the subscribers. At the time the committee was formed it was supposed that the Members and Associates of the Pharmaceutical Society would naturally feel interested in promoting the object, and accordingly Dr. Letheby and Mr. Redwood were appointed joint treasurers. It was, however, ascertained that the Members and Associates desired to have some memento of their late Professor, in connection with the Pharmaceutical Society, in addition to the above, which had originated in the London Hospital.

At a meeting of the committee held at the London Hospital, on Friday, the 4th of March, this additional proposition was submitted for consideration, and after some discussion it was decided that the prospectus of the proposed memorial having been settled and published, it was inexpedient to re-open the question; and that any proceedings of the Members and Associates of the Pharmaceutical Society, in furtherance of the object they desired, should be distinct from the proceedings of that committee. A sub-committee was appointed to take into consideration the selection of a sculptor to execute the bust, and to report to the committee at the next meeting.

At a meeting of the committee held at the London Hospital, on Friday, March 11th, the sub-committee presented their report, and recommended the appointment of Mr. Macdowall, R.A., as the sculptor to execute the bust, which recommendation was adopted by the committee. The sub-committee was empowered to carry the resolution into effect, and also to consider as to the selection of an artist and the style of the engraving, which subject was postponed until a future meeting of the committee.

The subject of the Pereira Memorial was referred to at a meeting of the Phytological Club, held March the 7th, and also at the Pharmaceutical Meeting on March the 9th; and a very general desire having been expressed in favour of a

MEMORIAL TO THE LATE DR. PEREIRA IN CONNEXION WITH THE PHARMACEUTICAL SOCIETY,

A preliminary meeting was held on the 21st of March,

Mr. Jacob Bell in the Chair,

At which it was Resolved,

"1. That a Subscription be commenced for the purpose of obtaining the Die of a Medal to be awarded as a Prize for researches or proficiency in Materia Medica, under such regulations as the Council of the Pharmaceutical Society may deem expedient; and that it is desirable to raise a sufficient sum to endow the Medal.

"2. That in the event of a sufficient amount being collected, a proof impression of a Portrait of Dr. Pereira be given to each Subscriber of not less than One Guinea, and an ordinary impression to each Subscriber of Half-a-Guinea.

"3. That the following Gentlemen be constituted a Committee, with power to add to their number.

(*The Names are included in the subjoined List.*)

"4. That the Members of the Council of the Pharmaceutical Society be requested to allow their names to be on the Committee.

"5. That Mr. Redwood and Mr. Bentley be requested to act as Treasurers, and Mr. Greaves as Secretary."

A circular has been issued containing a copy of the above resolutions, and announcing that communications may be addressed to the treasurers, Professor Redwood, 19, Montague Street, Russell Square, and Professor Bentley, 11, Argyll Square, to any Member of the Committee, or to Mr. Greaves, Secretary, 17, Bloomsbury Square.

COMMITTEE.

A. Allchin
J. Barnard
W. Bastick
Jacob Bell
W. L. Bird
W. H. Bucklee
S. Cartwright, F.R.S.
C. Cracknell
J. T. Davenport
Henry Deane, *V.P.*
W. Dickinson
G. Francis (*Witham*)
J. B. Edwards, Ph.D. (*Liverpool*)
F. Garden
J. Garle
J. P. Gassiot, F.R.S.
J. Gifford, *President*
R. W. Giles (*Clifton*)
S. Highley, Junr.
T. H. Hills
W. Hooper
J. E. Howard
J. Ince
C. C. Luckombe
J. Macfarlan (*Edinbro'*)
F. Middleton
T. N. R. Morson
T. Savory
C. Savory
W. Southall
P. Squire
R.W. Tamplin, F.R.C.S.
J. H. Tustin
G. Waugh
J. Woolley (*Manchester*)

It should be understood that the two Committees are proceeding with their respective objects, and although not officially connected, they are mutually assisting each other. The treasurers of each Committee receive subscriptions for both, leaving subscribers to exercise their unbiassed discretion. As the Committee at the London Hospital have decided to present an impression of a portrait to each subscriber, it is not improbable that the Bloomsbury Square Committee will, in the event of a sufficient amount being collected, make an arrangement for receiving the requisite number of impressions of the same portrait. In reporting the proceedings of the two Committees, we recommend both the objects contemplated, as worthy of the attention of our readers. It is right that a bust of Dr. Pereira should be placed in the Medical School of the London Hospital, where he for many years held so high a position as a Professor; and the establishment of a medal in connexion with the Pharmaceutical Society as an encouragement to researches in Materia Medica, will have the effect of perpetuating his memory as a Professor in that Institution, while it will at the same time serve as a stimulus to industry, and promote the advancement of science by inducing others to follow in his steps.

HONORARY TESTIMONIAL TO PROFESSOR LIEBIG.

A Committee has been formed, consisting of fifty-eight gentlemen, with the view of promoting a subscription, by the pupils, friends, and admirers of Baron Liebig, for the purpose of presenting an Honorary Testimonial to that eminent Chemist, on the occasion of his retiring from his duties as Professor in the University of Giessen. Professor Graham is appointed Chairman of the Committee; Warren de la Rue, Esq., Treasurer; B. C. Brodie, Esq., and Professor Hofmann, Honorary Secretaries; and Mr. Johnson (10, Middlesex Place, New Road), Assistant Secretary.—Messrs. Masterman and Co., and Messrs. Coutts and Co., receive subscriptions.

The amount of each subscription is not to exceed £5 5*s*.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

NOTICE is hereby given, That at a Special General Meeting of the Society, appointed to be held at the House of the Society, 17, Bloomsbury Square, London, at Eleven o'clock in the forenoon precisely, on Wednesday, the 6th day of April next, *Forms of Voting Papers*, for use at the future Annual Meetings, will be submitted to the Meeting for confirmation, in compliance with the provisions of 15 and 16 Vic., c. 56, which require that the Forms of Voting Papers for the Election of Officers shall be defined in the bye-laws, and that all bye-laws shall be confirmed by a Special General Meeting of the Society.

GEORGE WALTER SMITH, *Secretary.*

FORMS OF VOTING PAPERS.

In the 3rd clause of the 15th and 16th Vic., cap. 56, being the Act for regulating the Qualifications of Pharmaceutical Chemists, it is enacted as follows:

"At all Meetings of the said Society at which votes shall be given for the election of officers, all Members entitled to vote may give their votes either personally, or in cases of residence exceeding five miles from the General Post Office, St. Martin's-le-Grand, London, by voting papers authorized by writing, in a form to be defined by the bye-laws of the said Society, or in a form to the like effect, such voting papers being transmitted under cover to the Secretary not less than five clear days prior to the day on which the election is to take place."

Voting Paper, May, 1853, *for the election of fourteen Persons as Members of the Council.*

CANDIDATES.

1	11*
2	12
3	13
4	14*
5*	15*
6*	16*
7	17*
8*	18*
9*	19*
10	20*

The names against which a Star is prefixed are those who are Members of the present Council, and who are eligible for re-election.

INSTRUCTIONS FOR VOTING.

Every Member voting must erase the names of all the candidates for whom he does not intend to vote. If more than fourteen names be left the voting paper will be rejected.

The voting paper, after the erasure of names, must be folded up and enclosed in the accompanying envelope, addressed to the Secretary.

To prevent imposition on the scrutineers, the Member must sign his name on the line on the outside of the envelope.

N.B.—The voting paper must be returned to the Secretary, by post, on or before the 12th of May.

The following are the Members who remain on the Council after the drawing by lot, in accordance with the provisions of the Charter:

Voting Paper for the Election of five Auditors.

CANDIDATES.

1
2
3
4
5
6
7

INSTRUCTIONS FOR VOTING.

Every Member voting must erase two of the above names, as the number of Auditors cannot exceed five.

This paper is not to be signed, but is to be folded up and enclosed in the envelope to the Secretary by the post.

LIST OF MEMBERS, ASSOCIATES, AND REGISTERED APPRENTICES

Elected in January, February, and March.

MEMBERS.

ABERDARE	Jones, Jones	Pennypound
ARNOLD	Wood, Anthony	Front Street
ASHTON-UNDER-LYNE	Leach, William	Stamford Street
ATTERCLIFFE	Appleton, Joseph H.	High Street
BATH	Lowe, Charles	5, Cheap Street
	Parker, Matthew	27, Brock Street
BEDFORD	Thorne, John	High Street
BILSTON	Webb, Thomas S.	High Street
BIRMINGHAM	Adkins, Henry J.	Ball Street
	Benson, Alfred	Holloway Head Street
	Cattell, George	88½, Bristol Road
	Churchill, John	31, New Street
	Foster, Alfred H.	Navigation Street
	Walker, John C.	16, Jamaica Row
BOSTON	Pilley, Samuel	Strait Bargate
	Pilley, John	Ditto
BOURNEMOUTH	Blacklock, Henry	
BRADFORD	Stanley, Samuel H.	Kirkgate
BRIGHTON	Willmott, Charles	32, Marine Parade
BURNLEY	Brumwell, Joseph	53, St. James's Street
	Hill, Charles W.	5, Blucher Street
CAMBRIDGE	Turney, Samuel B.	44, Bridge Street
CARDIFF	Phillips, Griffith	Duke Street
CIRENCESTER	Mason, Joseph W.	Dyer Street
DUDLEY	Bell, Edward C.	Hall Street
	Buck, Richard C.	High Street
DUNSTABLE	Clarke, Tom G. B.	High Street
FORFAR	Law, William	High Street
GLOUCESTER	Stafford, William	10, Northgate Street
GREAT BRIDGE	Butler, James	West Bromwich
GREAT DRIFFIELD	*Sterriker, John	
GREAT GRIMSBY	Read, Jun., Thomas	Bull Ring
HASTINGS	Mason, William	High Street
LANGHOLM	Rome, Robert M.	High Street
LEAMINGTON	Wing, Alfred	10, Bath Street
LEICESTER	Symonds, John C.	Hotel Street
LIVERPOOL	Kirk, Thomas	109, Salisbury Street
	Rodgerson, William	10, St. James's Street
	Vose, Thomas	135, London Road
	Wright, William	21, Myrtle Street

London	Bachelet, Pierre Eloy	3, Hornsey Road
	Barnes, James B.	1, Trevors Ter., Knightsbridge
	Buncombe, Robert	38, Lamb's Conduit Street
	Fenn, John T.	83, Regent St., Westminster
	Freeman, Richard	5, Clayton Pl., Kennington Rd.
	Haines, Parton J.	28, Upper Albany St. [Garde.
	Horncastle, John	12, Stanhope Ter., Hyde Park
	House, David W.	177, St. George's Street, East
	Jeffrey, Russell	500, New Oxford Street
	Kettle, Joseph	79, Margaret St., Cavendish Sq.
	*Morson, Thomas	19, Southampton Row
	Nicholls, John	Celbridge Pl., Westbourne Pk.
	Northway, John	27, Great Tower Street
	Palmer, Robert	33, Wilton Place, Belgrave Sq.
	Peacock, Hasserton R.	170, High Street, Poplar
	Readman, Henry	18, Mortimer St., Cavendish Sq.
Manchester	Hepworth, William	1, Ducie Street
Margate	Quested, George	Market Street
Markinch	Conacher, David	
Matlock-Bath	Flower, Thomas S.	Museum Parade
Montrose	Mac Rae, James R.	8, High Street
Newcastle	Newton, George	Barras Bridge
Norwich	Pitts, Robert C.	8, St. Giles Street
Nuneaton	Biffe, Thomas	Market Place
Oxford	Luff, William	Corn Market Street
	Thurland, Edward	10, Magdalen Street
Paisley	Motherwell, Nathaniel C.	Orchard Street
Preston	Brandreth, Lawrence	77, Church Street
	Edmondson, John	100, Fishergate
Retford	Claber, Francis	Market Street
Ryde	Gibbs, William	Union Street
Sheffield	Binns, Samuel	60, Fargate
Shotley Bridge	Bastin, William	Front Street
Shrewsbury	Blunt, Thomas	The Wyle-Cop Street
	Pidgeon, Henry	High Street
Stratford-on-Avon	Loggin, Charles F.	High Street
Sudbury	Harding, Henry	3, Old Market Place
Sunderland	Thompson, William	87, High Street
Sutton Bridge	Sutterby, Jonathan N.	High Street
Tring	Chapman, John	Market Street
Wareham	Randall, Thomas	South Street
Wellington	Hooker, Thomas Ellis	South Street
Wigan	Barnish, Edwin	Market Place
Witney	Bomford, Esau	High Street
Worcester	Griffiths, James W	86, High Street
Yarmouth	Cobb, John S.	George Street

MAJOR EXAMINATIONS.

Bachelet, Pierre Eloy	Paris
Barker, William	Stockton
Baxter, William Walmisley	Bromley
Blackburn, Francis	Ramsgate
Boyce, George	Chertsey
Bromley, Richard M.	Dover
Clarke, William Richard	Leighton
Clayton, John Oates	Wisbeach
Coles, Charles	Weymouth
Conacher, David	Markinch
Deck, Arthur	Cambridge
Dore, John Read	Helston
Duchesne, Robert	Cambridge
Duncan, William	Rothesay

Evans, Evan	Carmarthen
Field, William	Birmingham
Fisher, William Henry	Liverpool
Fitze, James R.	Blandford
Guy, George Henry	Bristol
Hall, John William	Birmingham
Harris, William Henry	Cambridge
Hill, Charles William	Hull
Hornsey, William	Edinburgh
Houlton, James	Grantham
Hunt, William	Sheffield
Laird, William	Dundee
Littlefield, James Wavell	Ryde
Love, John	Sandgate
Marks, Edward Lloyd	Swansea
Medley, William	Derby
Morgan, William	Richmond
Mousell, Thomas	Birmingham
Mumford, George	Dorking
Raynor, John	Newark
Robinson, Benjamin	Lancaster
Salisbury, William Bryan	Sheffield
Shepherd, Thomas	Wakefield
Sidley, Insall Thomas	Edinburgh
Skrimshire, Thomas	London
Taylor, John Nunwick	Lincoln
Tims, Thomas Lamb	Leamington
Turner, Charles Ernest	Leominster
Yates, William	Bridgnorth
Youngman, Edward	Chelsea

MINOR EXAMINATIONS.

Andrews, Frederick	Clapham
Barford, James Gale	Wokingham
Barker, Matthew Mark	York
Clifford, John, R.S.	London
Cotton, John Lovering	Barnstaple
Dru, Casimir Theodore Aimé	Mauritius
Elsey, Charles	Horncastle
Gissing, Thomas Waller	Ipswich
Hands, William	Cheltenham
Harnett, Alfred	Kingston-on-Thames
Harris, Robert	Northampton
Howell, Thomas	Haverfordwest
Jefferson, Ebenezer W.	Beccles
King, Thomas	Wendover
Kirkman, George Buchanan	Clapham
Lawrence, Henry	Richmond
Lewis, Charles William	London
Lofts, Richard, P. B.	London
Luff, Henry Thomas	Poplar
Marks, Edward Lloyd	Swansea
Mumford, George	Dorking
Orton, Richard John William	Brighton
Parkes, John Prior	Nantwich
Patman, George	Berkhampstead
Reid, Niel	Perth
Salisbury, William Bryan	Sheffield
Shepherd, George Prentis	Canterbury
Sidley, Insall Thomas	Edinburgh
Sirett, George	Buckingham
Speechly, George	Peterborough

Steel, Henry	Chatham
Stoneham, Phillip	London
Taylor, Johnston James	Edinburgh
Turner, Charles E.	Leominster
Turner, William Henry	Oxford
Twitchell, Richard	Stonehouse
Varness, Frederick	London
Vizer, Edwin Bennett	Ledbury
Walmsley, Samuel	Wen
Walsh, Edward	Stockport
Willey, Josiah	Bristol
Yarde, Giles	London

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Beach, Thomas C.	Mr. Beach	Bridport
Bennett, George	Mr. Groves	Blandford
Blenkin, Peter S.	Mr. Lofthouse	Hull
Bogle, John J.	Mr. Shepperley	Nottingham
Bridges, George	Mr. Burgess	Dover
Brown, Charles	Mr. Thorne	Bedford
Challen, John	Mr. Kernot	Poplar
Colquhoun, William	Mr. Harold	Battle
Cracknell, Benjamin	Mr. Reynolds	Halesworth
Crosby, Joseph P.	Mr. Greaves	Bakewell
Dalby, Robert E.	Mr. Stead	Leeds
Dowse, Thomas	Mr. Marks	Bradford
Elliott, Robert	Mr. Steward	Yarmouth
Fallowfield, Jonathan	Mr. Sowerby	Carlisle
Forth, William	Mr. Headley	Bridlington
Gee, Isaac	Mr. Laycock	Rotherham
Halloway, John	Mr. Thompson	Carlisle
Harridge, Alfred F.	Mr. Harrington	Rochford
Hazeland, Adam W.	Mr. Rich	Weston-super-Mere
Hodgkinson, John B.	Mr. Brooker	Macclesfield
Hotchkiss, William	Mr. Ablcy	Hereford
Hughes, John G.	Mr. Gibson	Bristol
Hunter, Harry	Mr. Harrington	Rochford
Hustwick, Thomas H.	Mr. Coupland	Harrowgate
Jones, Oliver	Mr. Roberts	Bourne
Jones, Charles W.	Mr. Jones	Carmarthen
Judd, William	Mr. Savage	Brighton
Kenerstone, Francis J.	Mr. Hill	Sherborne
Laffer, Edmund H.	Mr. Fowler	Torrington
Laycock, Thomas C.	Mr. Laycock	Rotherham
Longhurst, James S.	Mr. Henry	London
Quinlan, Joseph	Mr. Times	Ditto
Radermacher, George	Mr. Bartlett	Chelsea
Roberts, George	Mr. Hollier	Dudley
Scott, Henry T.	Mr. Reid	Blandford
Sinclair, George	Mr. Gilpin	Newcastle
Snelling, Francis	Mr. Snelling	Horsham
Symes, Henry	Mr. Whitmore	London
Warburton, James P.	Mr. Smallwood	Macclesfield
Webb, Thomas P.	Mr. Hollier	Dudley
West, Robert G.	Mr. Edwards	Liverpool
Whittle, Thomas	Mr. Davies	Chester
Woollons, Charles L.	Mr Woods	Worcester

PHARMACEUTICAL MEETING,

March 9th, 1853.

MR. GIFFORD, PRESIDENT, IN THE CHAIR.

The following Donations to the Library and Museum were announced:

The Literary Gazette and *The Journal of the Society of Arts* for the past month.
The Annals of Pharmacy and Practical Chemistry, vol. i., from the Editors.
A Toxicological Chart, by Little, from Mr. George Whipple.

Specimen of Bark of Alstonia scholaris, from Mr. Bell.
Section of Wood of Sambucus niger, from Mr. Peter Squire.
Resinous deposit from Simple Extract of Colocynth.
Resinous deposit from Extract of Hop—Paraffine from Peat, from Mr. G. Whipple.
A Collection of Drugs from Aden, illustrating the papers published on this subject at pages 226, 268, and 385 of the present volume of this Journal, from James Vaughan, Esq.

Specimen of Sarsaparilla, recently imported from Jamaica, from Mr. George Roberts, of 32, Moorgate Street. The following communication was received with this specimen:

32, *Moorgate Street, February* 2, 1853.

TO THE PRESIDENT AND COUNCIL OF THE PHARMACEUTICAL SOCIETY.

Gentlemen,—Having found samples of Sarsaparilla of the kind sent herewith new to the Drug trade, I have presumed that a specimen may be of interest to the Society.

The plant is, I believe, a native variety of Jamaica, and is found on that island in considerable quantity in the locality from whence the specimen has been forwarded. My correspondent informs me that it is extensively used on the island in the same manner as the Sarsaparilla of commerce, and that if equally a marketable article in this country he can prepare it to sell at a rate much below the usual kinds.

The present bulk may probably occasion charges disproportionate to the value and prove a hindrance to the importation; but if assured of purchasers for a carefully prepared extract I will recommend a trial shipment. The small experimental parcel that I have received is about seventy pounds, the bulk of which I have placed in the hands of Messrs. Merry and Son, to be included in one of their coming Drug sales, but having reserved a few pounds for experimental purposes, I can present the Society with further specimens if desired.

It may be of further interest to the Society to know that I have, in consequence of the perusal of Dr. Hamilton's papers on the medicinal plants of the West Indies, published in the Pharmaceutical Journal, directed a trial shipment of Moringa seeds yielding the Oil of Ben, and of the extract of the root of Cassia occidentalis.

I have the honour to be, Gentlemen,

Your obedient Servant,

George Roberts.

Mr. Thomas Herring did not think the specimen sent by Mr. Roberts was true sarsaparilla, as it possessed none of the flavour of sarsaparilla, nor did it correspond in appearance with any varieties of the drug that he had ever seen. The fact of its coming from Jamaica did not prove any connexion between it and Jamaica sarsaparilla, as it is well known that the latter is not a native of Jamaica.

Mr. Bentley had not had an opportunity of examining the specimen, but would endeavour to do so before the next Meeting, and report the result.

ON A SPECIES OF SMILAX, AND A NEW COMMERCIAL SORT OF SARSAPARILLA WHICH IS OBTAINED FROM IT.

BY ROBERT BENTLEY, F.L.S., &c.

Professor of Botany, &c., to the Pharmaceutical Society.

THE specimens which furnished the materials for the following paper were forwarded to me by Mr. Bell, who obtained them from the museum of the late Dr. Pereira. They consisted, 1st., Of a portion of the stem of a species of Smilax furnished with leaves and fruit, but there were no flowers; and, 2ndly, Of a bundle of Sarsaparilla root as imported, which was stated to be the root of the above species of Smilax.

The history of the specimens is as follows:—The late Dr. Pereira received them from Mr. G. U. Skinner, one of the importers. They were collected in Guatemala, about ninety miles from the sea, in the province of Sacatepequez, by persons usually employed in the culture of Cochineal, but who, through the failure of that crop last year, were glad to turn their attention to the other products of this region.

The first point to which I directed my attention was to determine, if possible, the specific name of the Smilax under examination. This I found to be a matter of great difficulty, partly owing to the very imperfect manner in which the genus Smilax has been described from the want of good specimens, and partly also from its extent (nearly 200 species being known to botanists). The difficulty was also increased in this case by the absence of flowers in the specimen. By referring, however, to Kunth's *Enumeratio Plantarum*, vol. v., p. 167, I at length found a description of a species of Smilax under the name of

Smilax papyracea.

Smilax papyracea, which corresponded in all the main points with the one I wished to determine. This species is thus described:—"Smilax papyracea, Poiret:—Caules angulati, sulcati, aculeati, glabri. Folia alterna, petiolata, ovali-lanceolata, acuta, basi rotundato-subtruncata, reticulato-trinervia, nervis venisque prominentibus, papyracea, viridia, utrinque glabra, 6-8 pollicaria longi, 2½ pollicaria lata. Petioli striati, pollicares. Reliqua ignota."

Four other descriptions are also given in the above work under the name of Smilax papyracea, described from specimens obtained from different sources; and a more detailed description by Grisebach may be seen in Endlicher and Martius's *Flora Brasiliensis Fasciculus* 5, p. 5, where there is also a plate of the plant. As these descriptions all differ somewhat from one another in certain of their minor characters, and as in no case does it appear that the flowers or fruit were known to the describers, and as the specimen before me is therefore a more complete one in many respects than those previously noticed, I subjoin the description of it as drawn up by myself:—Stem 4-angled, somewhat striated, smooth, furnished with scattered recurved prickles placed at the angles of the stem, the smaller branches being almost destitute of prickles. Leaves membraneous, scattered, alternate, ovate-oblong, ovate-elliptical or oblong, rounded at the base, or slightly cordate, acute pointed, or occasionally rounded and mucronate, entire at the margins and somewhat wavy, glabrous, 5-nerved, reticulated, the three central nerves rather prominent, and leaving between them an oblong lanceolate space, the two lateral nerves indistinct, and passing close within the margins. Petiole about an inch long, without prickles, sheathing at the base, and furnished with two long spirally-twisted filiform tendrils, which are inserted into it at distances varying from two to four lines above its base. Leaves from four to six and a-half inches long, and from one to three inches broad. Peduncles axillary, without bracts, smooth, somewhat flattened, from one to four inches in length, bearing a roundish receptacle of about two lines broad, from which numerous pedicels (twenty to thirty) arise, arranged in a compact cluster. Pedicels smooth, from four to six lines long. No flowers. Fruit a berry, about the size of a pea, red? two or three celled, two or three seeded. Seeds roundish, with a membranaceous testa, dark coloured.

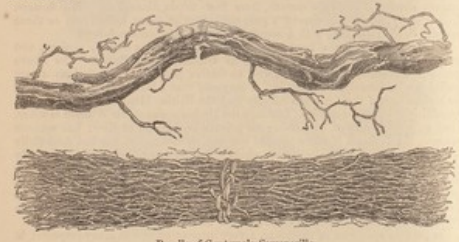
This plant has hitherto been found only at Cayenne, in French Guiana, and on the borders of the Amazon and its tributaries, in Brazil. The above specimen, therefore, if rightly referred to Smilax papyracea, will furnish a new locality for it, namely, Guatemala. I may add that I have searched in vain in the herbariums of the Linnæan Society and the British Museum for any Smilax resembling the present species. Through the kindness also of Sir William Hooker, I had an opportunity of examining his private herbarium at Kew, but without success. Sir William Hooker pointed out one species to me, marked doubtfully as Smilax cumanensis, Schlechtend; which certainly resembled mine remarkably in the texture and shape of the leaves, which were the only portions of the plant I took to Kew with me. Unfortunately there was no fruit on his specimen, and as the fruit of mine did not agree with the description of it as given by Schlechtendal, as well as differing also from the latter in some other particulars, it could not be the same plant if this has been properly described.

The present specimen is, therefore, a very interesting one in many respects; in the first place by furnishing us with a new locality for Smilax papyracea; secondly, in being probably the only specimen of the plant in this country, and indeed the only one which has been described with regard to the flowers, stalks, and fruit, either here or abroad; and, thirdly, in the fact that Smilax papyracea is now generally regarded in this country, on the authority of Martius and Riedel, as one of the sources from which the Brazilian sarsaparilla of commerce is obtained. Dr. Lindley, however, seems to doubt this fact, as he has not described the species at all in his *Medical and Economic Botany*.

Martius also states, with regard to the roots of Smilax papyracea, that they abound more than any other species of Smilax with Pariglin, or as it is now

more generally called Smilacin, and which is probably the chief active constituent of sarsaparilla, and hence, and also from the fact of Brazilian sarsaparilla having been before the introduction of Jamaica sarsaparilla the most esteemed kind in this country, we have *à priori* evidence that the sarsaparilla root obtained in Guatemala from probably the same plant, possesses also the medicinal properties usually considered to be possessed by it. The fact, however, of Brazilian sarsaparilla containing a larger amount of Smilacin than the other sorts, has not, I believe, been confirmed by the analyses of others.

Having now described the specimen of Smilax somewhat in detail, on account of its great interest, we pass in the next place to the description of the bundle of sarsaparilla root which accompanied it, and from which it was stated to have been derived. The roots of which this is composed are unfolded, and tied together in the middle by means of a flexible monocotyledonous stem, resembling a species of Sedge, or Rush, into a loose somewhat cylindrical bundle. (*See figure.*) The bundle from which this description is taken is about two feet eight inches long, twelve inches in circumference, and weighs nearly two pounds. It is free from rhizome or chump. In the manner of packing, the only other commercial variety of sarsaparilla which it resembles is the Brazilian; thus it agrees with the latter in the roots being unfolded and being free from rhizome or chump; and also in their being tied together into a somewhat cylindrical bundle or roll by means of a flexible monocotyledonous stem. The rolls, however, of Brazilian sarsaparilla are of a much more compact nature, and the flexible monocotyledonous stem called Timbotitica, with which they are tied together, is not of the same nature as that which is used to tie up the bundle before us. Thus the Timbotitica has a somewhat triangular shape, with three deep incisions into its interior, and a transverse section shows a very porous structure like a piece of cane; but the latter, although somewhat triangular in shape, is not of so firm a texture, has no incisions into its interior, and the transverse section does not present so porous a structure.



Bundle of Guatemala Sarsaparilla.

Externally the roots are much furrowed longitudinally, and are frequently swollen or gouty, resembling in these respects the Caraccas or Gouty Vera Cruz sarsaparilla. They vary in colour from a pale yellow to an orange-red. All the roots are furnished, more or less, with branched rootlets or *beard*. Their average thickness is about that of a common writing quill, but they are frequently larger, and in some cases smaller. The cortical portion is very brittle, and is often cracked in an annular manner, and may be easily separated from the ligneous cord or meditullium beneath. When the roots are bruised or rubbed a shower of white dust arises from them, which, when examined by the

microscope, is found to be composed of starch granules, presenting generally the characters of those usually obtained from the root bark of the different commercial sorts of sarsaparilla, that is, the granules are frequently compound, consisting of from two to six aggregated together, and when separate, they are seen to be of a small size, averaging the 2000th of an inch in length, sometimes of an irregularly spherical or triangular shape, but more frequently, in consequence of their mutual pressure upon one another, they become more or less flattened at the base, so as to be mullar shaped, or in consequence of being pressed upon at more than one point, they present a dihedral or trihedral summit. The starch granules, however, of the root under examination, present this peculiarity, that is, they have a very distinct hilum, which is generally cracked in a stellate manner, while the starch granules of the other commercial sorts of sarsaparilla which resemble this in their amylaceous character, present a very indistinct hilum, or none at all, when viewed by ordinary light, although readily perceived by the aid of polarized light. This difference in the appearance of the starch granules, is probably owing to some difference in the manner in which this sort of sarsaparilla has been prepared. The taste of the root is amylaceous, and perhaps slightly acrid, but it has no perceptible odour.

Upon making a transverse section we find a thick cortical portion, which is generally colourless, but sometimes presenting a faint roseate, or pinkish appearance. Within this cortex we find the ligneous cord or meditullium. In thickness the cortex is generally from one-half to one-third that of the meditullium.

When examined by the microscope the cells of the inner cortical layers are found to contain bundles of acicular raphides, and a large number of the starch granules already described. The pith also is found commonly to contain a number of similar starch granules. The breadth of the pith is usually from one to one and a-half, or perhaps a little more, that of the woody zone. In this respect it resembles the Honduras sarsaparilla, and, according to Schleiden, also all those sorts of sarsaparilla which are obtained from Central America. The cells of the Liber, or, as it is called by Schleiden, the *nucleus sheath*, are elongated radially or from within outwards, and have walls which are thicker on the inner than the outer side. In this respect it resembles the South American and Mexican sarsaparillas, which Schleiden says always present this peculiarity. This microscopical appearance is remarkable, because, according to Schleiden, the Honduras and all the Central American sorts of sarsaparilla are characterized by having the cells of the nucleus sheath either square or somewhat elongated transversely, and all their walls of nearly equal thickness, and he believes that he can distinguish Central American from South American and Mexican sarsaparillas from the appearances thus presented, combined with the different relative proportions of the woody layer and the pith already alluded to. But if this be true generally (which, so far as my experience goes, is not absolutely the case, having observed some sorts of Brazilian sarsaparilla in which the cells of the nucleus sheath were elongated somewhat in a direction from within outwards, and so far therefore agreeing generally with the anatomy of South American sarsaparillas according to Schleiden, but yet had their outer and inner walls of nearly equal thickness, and thus agreeing with the Honduras variety), it is certainly not true in the present sort, for here we have a Central American sarsaparilla which agrees with Schleiden's arrangement generally as regards the relative proportions of pith and woody layer, but differs from it in the cells of the nucleus sheath being elongated from within outwards or radially, and having walls which are thicker on the inner than the outer side.

Having now generally described the external, internal, and microscopical characters of our specimen of sarsaparilla root, we have in the next place to notice briefly its chemical characteristics.

If we make a transverse section and apply to it a drop of sulphuric acid, the woody zone is immediately changed to a dark red or nearly black colour (owing

to the action of the acid on the smilacin), while the pith and the inner cortical layers remain unaltered.

Again, if a decoction be made, it is seen to be much paler in colour than that of Jamaica sarsaparilla, and if to it when cold a solution of iodine be added, it immediately becomes of a dark-blue colour from the formation of iodide of starch. Again, if a strong decoction be poured into alcohol, a copious precipitate of starch is likewise produced. Again, if the extract prepared from this sort of sarsaparilla be rubbed up with water it is not completely soluble, but it forms a turbid solution, which immediately becomes dark-blue on the addition of tincture of iodine.

From the characters above given of our sarsaparilla root, and particularly in its thick, swollen, or gouty appearance; the large size and pale colour of its cortical portion as compared with the meditullium; the abundance of starch or meal contained in the cells of its inner cortical layers; and in its behaviour generally with reagents, we have no difficulty in referring it at once to the Mealy or Amylaceous division of the Sarsaparillas in the arrangement of the late Dr. Pereira. In this division we have described three commercial sorts of sarsaparilla, namely, the Honduras, the Caraccas, and the Brazilian. The question now arises, can our sort be referred to either of these? We think not, although in some respects it has characters bearing resemblance to them all. Thus, it resembles the Brazilian, as we have seen, somewhat in its mode of packing. But it differs from it in the roots being generally larger; much more furrowed in a longitudinal direction externally; in being of a yellowish or orange red colour rather than brownish or reddish-brown like it; and also in having generally more rootlets or beard. Anatomically, it approaches the Brazilian sort in the relative proportion of the cortex and meditullium, and also in the radial direction and other characters of the cells of the nucleus sheath; but it differs from it in the pith being smaller in proportion to the woody zone. Chemically, also, in the action of sulphuric acid on its transverse section it precisely resembles the Brazilian sort, in the fact that the woody layer is changed to a dark red or nearly black colour, while the pith and inner cortical layers are quite unaltered. This difference in the action of sulphuric acid on the woody layer, as compared with that on the pith and inner cortical layers, is, I think, not so strikingly the case in the other sorts of mealy sarsaparillas—at least not in the Hondurans—for upon the addition of sulphuric acid to its transverse section, I have generally observed the inner cortical layers to become slightly reddened in addition to the change of colour produced in the woody layer, as in the former instances. In the Caraccas sarsaparilla also, occasionally, we observe a somewhat similar alteration in the action of sulphuric acid on the inner cortical layers, but it is not so marked as in the Honduras kind. Caraccas sarsaparilla also I find has its pith generally more affected on the addition of sulphuric acid than the other mealy sarsaparillas. These few remarks, however, on the chemical action of sulphuric acid on the transverse sections of sarsaparilla require further examination; but still, as a general rule, I think they will be found correct.

The new sort of sarsaparilla differs altogether in the manner in which it is packed from the Caraccas and Honduras sorts. It resembles, however, the Honduras in thickness; also in the proportion borne by the pith to the woody zone; and also generally in the relative thickness of the cortex and meditullium. But it differs from it in commonly being marked externally by deeper longitudinal furrows; in its colour; in having more rootlets or beard; in the direction and other characters of the cells of the nucleus sheath; and as noticed above, also in some degree in the action of sulphuric acid on its transverse section.

To the Caraccas sort it bears some resemblance in its thick, swollen, or gouty appearance; also somewhat in colour; also in its presenting deep longitudinal furrows externally, and in the direction of the cells of the nucleus sheath. But

it differs in having more radicles or beard; in the pith being smaller in proportion to the woody layer; perhaps also slightly in the action of sulphuric acid on its transverse section; and generally in the cortical portion being smaller in proportion to the meditullium, and being less mealy.

From these remarks it may be seen that the new sort of sarsaparilla seems to resemble the Brazilian most in its internal structure and chemical characteristics, and the Caraccas sort most externally. The differences between it and the Brazilian are not greater than may be readily accounted for by differences of soil, climate, and mode of preparation; and there can therefore, I think, be but little doubt that these two sorts may be produced by the same plant.

With regard to the therapeutical value of this sarsaparilla, I have but little hesitation in asserting that it is quite equal, if it be not superior, to the other commercial mealy sorts. My opinion on this matter is founded in a great measure on some experiments made by Mr. Daniel Hanbury, with respect to the quantity of extract afforded by it, and the results of which he has kindly furnished me. Mr. Hanbury thus writes:—"My experiment as to the extract it would afford, was made upon twelve pounds (avoirdupois), which having been treated in the usual way, that is, by repeated decoction and evaporation of the liquors, gave 2lbs. 11ozs. (avoirdupois weight) of solid extract of good consistence." The yield therefore, in this case, was about twenty-two per cent. Now, as the quantity of extract yielded by a given weight is usually considered as one of the tests of the goodness of sarsaparilla, this must be considered a most favourable result; for, according to the experiments of Mr. Battley, 3lbs. (troy) of Honduras sarsaparilla yielded 10½ ozs. of solid extract, or only about eighteen per cent. Again, according to the experiments of Hennell, 5lbs. of the root of Honduras sarsaparilla, of fine quality, yielded 1lb. of extract, or twenty per cent. The average yield of Honduras sarsaparilla must be considered, therefore, as less than that of the present sample. Again, the average yield of extract by Caraccas and Brazilian sarsaparillas is probably somewhat less than Honduras. On the data furnished by yield of extract, therefore, the present sample must be taken as somewhat superior in quality to the other mealy sarsaparillas.

Now, as regards the *taste* of this sarsaparilla (another criterion of the value of different samples), I cannot distinguish any appreciable difference between this sort and the Honduras or other mealy sorts; no inference one way or the other can be drawn from this test therefore. Again, the *beard* is usually considered as another criterion of excellence, and in this respect the present sample (as far as I can judge from the bundles I have seen) is superior, generally containing more beard than either of the other mealy sorts, and this is no doubt the reason why it yields more extract, as it has been generally observed that the beard yields a greater proportion of extract than the main root. As to the other criterion of goodness, namely, *colour*, I do not think any positive inference can be drawn either way. On the above grounds, therefore, I think it must be admitted that the present sample is equal, if not superior, to Honduras, Caraccas, or Brazilian sarsaparillas.

Adding this new sort to the list of previously described mealy sarsaparillas, the division of these in the late Dr. Pereira's arrangement will now comprise four commercial sorts, namely, the Brazilian, the Caraccas, the Honduras, and the new sort, which I propose to call the Guatemala. Carrying out his arrangement, they may be subdivided thus:

A. Pith two to four times the breadth of the woody layer; cells of the nucleus sheath elongated radially, and having walls which are thicker on the inner than on the outer side.

  a. Pale, folded, often swollen or gouty roots, with the rhizomes or stems attached.....1. Caraccas.

  β. Reddish-brown, unfolded roots without rhizomes or stems attached, packed in rolls or cylindrical bundles.....2. Brazilian.

B. Pith one to one and a-half times the breadth of the woody layer.
   α. Folded roots; cells of the nucleus sheath square or elongated transversely, and nearly equally thick on all sides .....3. Honduras.
   β. Unfolded roots without rhizome, packed in rolls or cylindrical bundles; cells of the nucleus sheath elongated radially, and having walls which are thicker on the inner than the outer side. .. ..4. Guatemala.

In conclusion, I would throw out a suggestion, that as the distinctive characters between this new sort of sarsaparilla and the Honduras are by no means very remarkable, and as the plant which produces the latter is probably also a native of Guatemala, may not this also be derived from the same botanical source, namely, the Smilax papyracea?

ON THE *INSECT-WHITE-WAX* OF CHINA.

BY DANIEL HANBURY.

Synonyms.—蟲白蠟 Chung-pih-là *i.e. insect white-wax*; Pih-là, Pe-la or Pé-la *i.e. white-wax*. In English, the names *White wax of insects*, *Chinese wax*, *Chinese insect-wax*, *Japanese wax* (*a*), *Tree wax*, *Chinese vegetable wax*, *Vegetable spermaceti*, have all been used to designate this substance.

The crude wax is called *Là-tcha i.e.* wax-sediment; the so-called coccoons of the insect *Là-chung* wax-seed, or *Là-tsze* wax-son; the insects also are called *Là-chung* (Julien).

History.—According to Siu-kouang-ki the author of a well-known Chinese treatise on agriculture called Nong-tching-tsiouen-chou, (*b*) it was not until the middle of the thirteenth century (*c*) that this remarkable production came into notice in China, previous to that date the wax of the bee alone having been employed. It appears, however, to have been by no means abundant at a period long posterior to this, as the Abbé Grosier speaks of it being reserved for the emperor and mandarins of high rank. (*d*) Du Halde in his *Description Géographique, Historique, Chronologique de l'Empire de la Chine* published in 1735 (*e*) gave an excellent account (*f*) of the production and cultivation of this insect wax, and it has subsequently been noticed with more or less accuracy by various other authors on China, all, however, appearing to borrow from the native writers.

The *Chung-pih-là* of the Chinese has been confounded with other insect products, as with the secretion of *Coccus ceriferus* Fabr. called *White Lac*, and with the substance formed by *Flata limbata*, *F. nigricornis* and other allied

(*a*) This name has been applied to a kind of wax supposed to be extracted from the seeds of *Rhus succedanea* Linn. as related by Kæmpfer (*Amæn.* p. 794) and Thunberg (*Flor. Jap.* p. 122), see Martiny's *Encyklopädie der Medicinisch-pharmaceutischen Naturalien und Robwaarenkunde* Band i., p. 172. A sample has been kindly presented to me by Dr. Theodor Martius, and I have likewise met with it in the London market, eighty cases having been offered for sale as *Japan Beeswax*, by Messrs. T. Merry and son, May 20, 1852. My specimens consist of a white wax, of somewhat rancid odour, in circular cakes of from 4 to 4½ inches in diameter, nearly one inch thick, flat on one side and rounded off on the other as if cast in a small saucer. They are sparingly covered with a white powder and, in Mr. Merry's wax, present here and there traces of a sparkling crystalline efflorescence. The fusing points of the samples I find to be respectively 125.6° and 131° Fahr. Dr. Martiny gives it as + 45° C. = 113° Fahr.

(*b*) Quoted by M. Stanislas Julien in his *Nouveaux renseignements sur la Cire d'arbres et sur les insectes qui la produisent*, *Comptes Rendus*, 13 April, 1840, p. 618.

(*c*) Du Halde says, not until the dynasty of Yuen, *i.e.* A.D. 1280.

(*d*) *General Description of China, translated from the French of the Abbé Grosier*, Lond. 1788, vol. i., p. 441. The Abbé, however, never visited China. His *Description Générale de la Chine* is an abridgment of the Memoirs of the Mission to Pekin by the Jesuits, see Dibdin's *Bibliographical, Antiquarian and Picturesque Tour*, vol. ii., p. 321.

(*e*) At Paris, in 4 volumes, folio.

(*f*) Tome iii., p. 435.

insects of the family *Fulgoridæ*. (*g*) The difference between it and these substances I will endeavour to point out.

Dr. Pearson who examined the white lac collected at Madras by Dr. James Anderson (*h*) has recorded the following as some of the characters of that substance (*i*).

White lac is brittle and semi-transparent; when strained and purified, it has a greater specific gravity than water; it fuses at 145° Fah.; is soluble in ether and in alcohol; it is imperfectly saponifiable with a fixed alkali. Pressed or rubbed until it be soft, it emits a peculiar odour. In the mouth it becomes soft and tough and has a bitterish taste. These properties indicate it to be essentially distinct from the Chinese insect-white-wax. The description of the formation of white lac given by Dr. Anderson does not accord with the best accounts of the production of the Chinese wax. (*j*)

The wax-like substance afforded by *Flata limbata* is dropped as a sweet sticky liquid upon the leaves of the plant upon which the insect feeds, so that they appear to be thinly bedewed with honey. "This," says Captain Hutton, "gradually accumulates, and as it passes from a liquid to a solid state, appears like a thick coating of wax upon the leaves, but as it dries by exposure to the sun and atmosphere, it hardens into a snowy white brittle substance, giving the tree the appearance of being *white-washed*, or frosted over with white sugar, like the top of a Twelfth Night cake. It then cracks and falls in pieces to the ground, where it soon dissolves from rain and dews and is lost."(*k*) This secretion, Captain Hutton states, was found "to dissolve readily in water, and when boiled and allowed to cool, a deposit of clear white crystals was formed in the vessel." Neither this deposit nor the crude substance could be combined with heated oil "while the attempt to melt it on the fire without water or oil, proved altogether abortive, the wax merely burning and consuming away till it became converted into a hard and baked substance. Melted in water, the mixture assumed a brownish hue with strong aromatic scent." Captain Hutton reasonably concludes that the Chinese wax is not the produce of *Flata limbata*. (*l*)

Production.—Until almost the present time the species of insect producing the Chinese wax has been a matter of great uncertainty. The foregoing accounts appear clearly to prove that it is not afforded either by the *Coccus ceriferus* Fabr. of India or by a *Flata*.

It is to the persevering endeavours of William Lockhart, Esq., of Shanghae, that we owe the discovery that the Chinese insect-wax is produced by a species of *Coccus* hitherto undescribed. Within the last three months this gentleman has transmitted to England a specimen of the crude wax as scraped from the tree, in which a number of the dried full-grown bodies of a female *Coccus* are to be found, as well as pieces of stick encrusted with the wax and with the insects still *in situ*. Mr. J. O. Westwood who has examined the specimen, has reported upon it to the Entomological Society, Feb. 7, 1853, (*m*) proposing at the

(*g*) See J. O. Westwood's *Introduction to the Modern Classification of Insects*, Lond., 1840, vol. ii., p. 429, also *Reports by the Juries—Exhibition of the Works of Industry of all Nations*, 1851. Lond. 1852, 8vo, p. 624.

(*h*) See *Correspondence for the Introduction of Cochineal Insects from America, the Varnish and Tallow Trees from China, the Discovery and Culture of White Lac, the Culture of Red Lac*, &c., by James Anderson, M.D. Madras, 1791, 8vo.

(*i*) *Observations and Experiments on a wax-like substance resembling the Pé-la of the Chinese*, *Phil. Transact.*, 1794, p. 383.

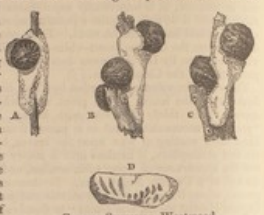
(*j*) I have never met with Dr. Anderson's *Monographia Cocci ceriferi*, Madras, 1790, where the insect according to Virey (*Comptes Rendus*, April 20, 1840, p. 666) is described and figured.

(*k*) *Note on the Flata limbata and the White Wax of China*, by Capt. Thomas Hutton, B.N.I. in the *Journal of the Asiatic Society of Bengal*, Calcutta, 1843, vol. xii., p. 898.

(*l*) The insect observed upon a privet near Turon in Cochin China, and figured by Sir George Staunton in his *Account of Lord Macartney's Embassy to China* (Lond., 1797, 4to, vol. i, p. 353) is evidently an immature *Flata*.

(*m*) *Athenæum*, Feb. 19, 1853, p. 229, also *Zoologist* for March 1853, p. 3820.

same time the name of *Coccus Sinensis* for the new insect. The imperfect condition of the specimens and the want of the male insect preclude the possibility of a complete scientific description being drawn up; the existing remains consist of a dry, hollow, nearly spherical mass, frequently somewhat shrivelled, externally shining and of a deep reddish-brown colour. This mass or shell, which is the full grown body of the female insect, varies in diameter from $\frac{1}{10}$ to $\frac{1}{5}$ of an inch. It has a linear opening on one side indicating the part at which it was attached to the branch, and is besides frequently perforated with one or more small holes. As the wood-cut shows, it occurs as it were, seated in the wax encrusting the branch, like a minute gall or small round sessile berry. Besides these large females, the wax contains imbedded in its under surface an abundance of minute insects in a younger state, which are probably the real producers of the wax. In form they are not unlike little oval wood-lice (*Oniscí*), as will be seen by the wood-cut at page 483. The crude wax itself forms around the branch a white, soft fibrous, velvety coating of from one to two-tenths of an inch in thickness. When scraped off, as in a specimen which I have examined, it occurs in light, flat, curled or rounded, irregular pieces, the larger of which are about half an inch in greatest length. Having observed that its microscopic characters presented features of interest, I sent a specimen to Mr. Quekett, the result of whose investigations will be found at page 482.



Coccus Sinensis, Westwood.

A B C. Mature female insects adhering to pieces of stick partially encrusted with the wax (*natural size*).

D. Vertical section of a piece of the crude wax, showing the position of the young insects (*magnified*).

So far as I can ascertain, no European has yet had the opportunity of examining the living wax insect in its native localities; I therefore insert the following account of its culture, as taken chiefly from Chinese authors, (*n*) at the same time making no attempt to reconcile it with the well-known habits of other species of *Coccus*. (*o*)

In the spring the coccoons containing the eggs of the insect are folded up by the cultivators in leaves (sometimes of the ginger plant) and suspended at various distances on the branches of the tree which is to be stocked. After having been thus exposed for from one to four weeks, the eggs are hatched and the insects which are white and of the size of millet seeds, emerge and attach themselves to the branches of the tree or conceal themselves beneath its leaves. Some authors state, that the insects have at this period a tendency to descend the tree, at the base of which, should there be any grass there, they would remain, and that, to obviate this difficulty the Chinese keep the ground perfectly bare so that they are induced to ascend.

(*n*) Quoted by Du Halde in his *Description de la Chine*, éd. 1735, tome iii., p. 495; by M. Stanislas Julien in the *Comptes Rendus*, 13 April, 1840 (pp. 618—625); also by Dr. D. J. Macgowan, in a paper *On the Uses of the* Stillingia sebifera *or Tallow Tree, with a notice of the* Pe-la *or Insect-wax of China*, contained in the *Journal of the Agricultural and Horticultural Society of India*. Calcutta, 1850, vol. vii., part 1, p. 164. Through the kind assistance of Mrs. Lockhart, I have been enabled to compare with these, one of the accounts in the original Chinese contained in the herbal called *Pun-tsaou-kang-mŭh*.

(*o*) It may be interesting to those unacquainted with the habits of *Coccus* to read the following lines respecting a well-known species, *C. Kermes*:

"In their youth, the females resemble little white *wood-lice*, which would have but six feet. They run upon the leaves, and afterwards fix upon the stems and branches of trees and shrubs, where they pass many months in succession. It is then that they assume the figure of a gall or excrescence."—Cuvier's *Animal Kingdom*, London, 1832, vol. xv., p. 286.

Wax-Tree and Insect.

Fac-simile of a drawing made from the Pun-tsaou-kang-mŭh. The upper characters on the left are *Chung-lĭ* (insect-wax); beneath them, *Lŏ-chung* (wax-seed); in the right-hand corner at bottom *Tung-tsing-shoo* (winter-green-tree). The larger characters on the right, are *Chung-pĭh-lĭ* (insect-white-wax).

According to the author of the Pun-tsaou-kang-mŭh the ground under the trees must be kept very clean in order to guard against ants devouring the insects. Fixing themselves on the branches the young insects speedily commence the formation of a white waxy secretion, which becoming harder suggests the idea of the trees being covered with hoar frost. The insect itself becomes [*gradually imbedded ?* or] as the Chinese authors say *changed into* wax. The branches of the tree are now scraped, the collected matter constituting the crude wax. The time of the collection probably varies in different districts, some authors giving June and others August, as the period at which the wax harvest takes place. At the latter period (August or September) the waxy matter containing the insects becomes so firmly attached to the tree that its removal would be attended with much difficulty, and it is in the wax thus left and at this period that a sort of case or coccoon ("purplish envelope" *Macgowan*) is formed, (*p*) in which the eggs of the insect are deposited. This nest or coccoon, which is stated to be of the size of a rice grain, gradually increases until in the

(*p*) Probably the inflated body of the mature female insect is here referred to.

following spring it becomes as large as a *hen's egg* (!), suggesting when attached to the branch the appearance of a fruit. (*q*) The coccoons, called *Lă-chung* or *Lă-tsze*, which enclose multitudes of eggs, are removed, sometimes together with a piece of the branch on which they are fixed, and reserved for the further propagation of the insect.

Respecting the tree or trees upon which the wax-insect feeds (for like the *Coccus lacca* there may be several trees that support it) it is evident that our information is as yet extremely defective. Mr. Fortune entertains great doubts whether the insect really feed as reputed on any species of *Rhus*, *Ligustrum*, or *Hibiscus*. When in China, he obtained from the province of Sze-tchuen through some Catholic Missionaries, a living plant which he was assured was that on which the wax-insect is found. (*r*) This plant which is now in England, is a deciduous woody-stemmed shrub of about 1½-feet high. A very scanty specimen of it which I possess, has imparipinnate, glabrous leaves; lateral leaflets 1½ to 1¼-inches long, including the petiolules which are about two lines long, eliptical, very oblique at the base, inequilateral, rather strongly serrated, penniveined and distinctly reticulated on both sides over the surface; terminal leaflet thrice as large as the rest, nearly ovate, very unequal at the base and with a petiolule nearly an inch long. As it has not yet flowered, neither the genus nor even the natural order can with certainty be determined; but judging from its leaves, the plant has much similarity, as suggested by Mr. Fortune, to some species of ash (*Fraxinus*). According to M. Julien, the plants upon which the wax-insect is reputed to feed are four in number:

1. Niu-tching.—This tree according to M. Adolphe Brongniart as quoted by M. Julien, (*s*) is *Rhus succedanea* Linn. Other names are applied in China to the Niu-tching (literally *pure-virgin*) as Tching-mou (*pure-tree*), La-chou (wax-tree). It is also called *Tung-tsing* in common with the following.

2. Tung-tsing.—This name Mr. Fortune has informed me is applied to *Ligustrum lucidum* Aiton. (*t*) Dr. Macgowan mentions *L. lucidum* as the tree on which the wax-insect is reputed to feed. Rémusat identifies it (under the name of *Towng-thsing*) as *Ligustrum glabrum* but cites no authority. (*u*) De Candolle has alluded to *L. glabrum* as var. *B* of *L. Nepalense* Wall. (*Prodrom.* viii. p. 294), and Thunberg has a *L. glabrum* among the *Plantæ obscuræ* of his *Flora Japonica*. (*v*)

Tung-tsing variously spelt *Tong-çin*, *Toung-thsing*, &c., is also called *Chou-tong-tsing* (water-winter-green); it is probably the *Chouï-la-chu* (aquatic-wax-tree) of Grosier.

Much attention, says Dr. Macgowan quoting a Chinese author and assuming *Ligustrum lucidum* to be the wax-tree, is paid to the cultivation of this plant: extensive districts of country are covered with it, and it forms an important branch of agricultural industry. The trees, which are propagated either by

(*q*) In the Pun-tsaou-kang-mŭh the expression used, signifies *fowl's-head*. Now it is quite certain that the bodies of the female *Cocci* received in Mr. Lockhart's specimen, had attained their full development. What then can the Chinese author mean by this monstrous aftergrowth? Can he have confused with it the packets of eggs suspended to the tree for the propagation of the insect?

(*r*) See *Gardener's Chronicle and Agricultural Gazette*, Aug. 21, 1852.
A solitary leaflet found in Mr. Lockhart's specimen of wax, so obviously corresponds with those of Mr. Fortune's plant, that I see little reason to doubt the fact of it being one of those which support the *Coccus sinensis*.

(*s*) Julien in *Comptes Rendus*, 13 April, 1840, p. 619.

(*t*) Mr. Fortune adds however, that although he has seen the tree in great abundance in districts of Chekiang and Kiangnan, he has never observed the wax-insect upon it. Indeed, I am myself of the opinion that the statement that the wax-insect feeds upon *Ligustrum lucidum* is altogether erroneous, for although this tree is certainly called *Tung-tsing*, yet Du Halde's assertion is that the wax-tree has branches and leaves *resembling* those of the Tung-tsing, while the fruits of the two trees are *different*.

(*u*) *Notices et Extraits des Manuscrits de la Bibliothèque du Roi*, &c., Paris, 1827, vol. xi, p. 274.

(*v*) Page 354, No. xxv.

seeds or cuttings, are planted in rows and pruned periodically, while the ground is well manured and kept free from weeds.

3. Chouï-kin (the *Kin* of moist places), Niu-la-chou (female-wax-tree) is thought by M. Julien to be allied to the *Mou-kin* (arborescent *Kin*) identified by Rémusat as *Hibiscus Syriacus*.

4. Tcha-la ("*appliquer-cire*") Julien, is cultivated chiefly in the country of Chou a dependency of the province of Sze-tchuen. Like the preceding, its botanical name is unknown.

Localities.—Insect-white-wax is collected in the provinces of Sze-tchuen, Hou-kouang, Yun-nan and Fo-kien (Julien), also in Che-kiang and Kiang-nan (Du Halde). Du Halde says that that collected in the provinces of Sze-tchuen and Yunnan, and in the territories of Hen tcheou and Yung tcheou is of superior quality.

Chemical Properties and Composition.—The chemical properties and composition of Chinese insect-wax have been elaborately and ably investigated by Mr. B. C. Brodie. (*w*) According to this chemist, the Chinese wax as it occurs in commerce, is a substance nearly in a state of chemical purity. By alcohol small portions of a greasy matter may be separated from it, and on distillation it affords traces of acrolein which is not a product of the pure wax. The impurities however are unimportant.

The melting point of the commercial wax is 181.4° Fahr.; (*x*) that of the perfectly pure wax 179.6°. Chinese wax is very slightly soluble in alcohol or ether, but dissolves with great facility in naphtha, out of which fluid it may be crystallized. The mean of Mr. Brodie's analyses of the purified wax gave its composition thus—

Carbon	82.235
Hydrogen	13.575
Oxygen	4.190
	100.000

which numbers agree with the formula $C_{108}\ H_{108}\ O_4$. (*y*) Although the wax is scarcely saponified by being boiled in a solution of caustic potash, it may readily be decomposed by fusion with the solid alkali becoming, as Mr. Maskelyne has observed, broken up into substances with the formula $C_{54}\ H_{56}\ O_2$ [cerotin] + $C_{54}\ H_{54}\ O_4$ [cerotic acid] two equivalents of water being assumed in the saponification. Mr. Maskelyne in some experiments performed subsequently to those of Mr. Brodie, has shown that by the action of lime and potash the cerotin may be oxidized, and the whole converted into cerotic acid. (*z*)

I would however refer the reader to the original papers of these gentlemen for a copious and interesting account of the chemistry of the wax.

Commerce.—Dr. Macgowan estimates the annual produce of Chinese wax as not far short of 400,000 pounds, valued at upwards of 100,000 Spanish dollars. At Ningpo he says the wax costs from 2½ to 35 cents (1*s.* to 1*s.* 6*d.*) per pound. (*aa*)

The only considerable importations of Chinese wax into England that I am aware of, were in the years 1846 and 1847, when nearly three tons were imported into London. Some of this wax sold in April, 1847, fetched 1*s.* 3*d.* per pound,

(*w*) *On the Chemical Nature of a Wax from China*, by Benjamin Collins Brodie, Esq., in the *Philosophical Transactions* for 1848, p. 159.

(*x*) I can confirm this statement so far as regards three specimens in my possession; a fourth, I find to fuse at 180° Fahr., while some prepared by myself from the crude wax sent by Mr. Lockhart, fuses at 182.75° Fahr. Dr. Ure states its melting point to be 196° (*Pharm. Journ.*, vol. vi., p. 69). Dr. Macgowan gives it as 160° Fahr., but this latter must surely be a misprint.

(*y*) *Op. cit.*, p. 170.

(*z*) *On the Oxidation of Chinese Wax by Nevil S. Maskelyne, M.A.*, in the *Quarterly Journal of the Chemical Society*, vol. v., p. 24 (April, 1852).

(*aa*) *Journal of the Agricultural and Horticultural Society of India*, vol. vii., part I, p. 164, &c.

a price too low, I believe, to be remunerative, and no further importation that I know of has since taken place.

The insect-wax occurs in commerce in circular cakes of various dimensions: some of those imported into London had a diameter of about 13 inches, a thickness of 3½ inches and were perforated near the centre with a hole ¼ths of an inch across. The broken surface generally exhibits the wax as a beautifully sparkling, highly crystalline substance somewhat resembling spermaceti but much harder; some cakes are internally much less crystalline and sparkling than others. The wax is colourless and inodorous or nearly so, tasteless, brittle and readily pulverizable at the temperature of 60° Fahr.

Uses.—In China, candles are made of the insect-wax *per se*, but more commonly of a mixture of it with some softer fatty substance. To give to these softer candles a hard coating and to prevent their guttering, they are dipped into melted insect-wax often coloured red with alkanet root,—sometimes green with verdigris. *

Mr. Lockhart tells me that the edges of books and the edges of the soles of shoes are rubbed with the wax in order to give them a bright face; and that it is also rubbed on the brush with which red earthenware is polished. (*bb*)

The use of the wax in the candle manufacture in this country has been made the subject of a patent granted in 1845 to Mr. Samuel Childs. He advises its mixture with stearic acid in the proportion of one part to twenty, and speaks also of employing it in the manufacture of "*Composite*," bees'-wax and spermaceti candles. When combined with stearine it has been found serviceable in what is technically called *breaking the grain* (*i.e.* diminishing the crystalline texture) of the stearine previously to it being formed into candles.

As a medicine, the insect-wax is used by the Chinese both externally and internally for a variety of ailments. Du Halde says "it makes flesh to grow, stops bleeding, eases pain, restores strength, braces the nerves and joins broken bones together." (*cc*) Grosier besides mentioning its employment as an application to wounds, states that it is sometimes swallowed to the extent of an ounce at a time as a stimulant (!) by those about to speak in public. (*dd*)

ON THE MICROSCOPICAL CHARACTERS OF THE INSECT-WHITE-WAX OF CHINA.

BY JOHN QUEKETT, ESQ., M.R.C.S., &C.,
Professor of Histology.

I have made repeated microscopical examinations of the insect wax of China in its crude state, which had been put into my hands by Mr. Daniel Hanbury for that purpose. When I received the wax, it was mostly in the form of rounded masses, varying from one-quarter to one-third of an inch in diameter; within these were enclosed small brown insects, which I find have been named by Mr. J. O. Westwood, *Coccus sinensis*. When a small portion of the wax is examined with a power of not less than 250 diameters, it is found to consist of a series of short filaments or cylinders, some of which are straight, but others more or less curved; within each cylinder is a tubular cavity, extending throughout its whole length. That this is a tube may be well shown by the addition of water, which will readily enter both extremities of the tube, and render these parts more transparent than those containing air. The diameter of the cylinders is on an average $\frac{1}{2500}$th of an inch, whilst that of the tube

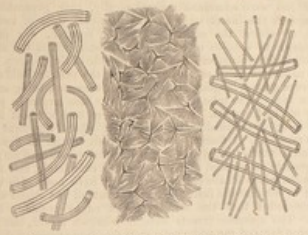
(*bb*) I will here acknowledge the kindness with which my friend Mr. Lockhart has ably assisted my investigation respecting the substance under notice. My thanks are also due to Mr. G. F. Wilson of Vauxhall for some valuable information about its commercial history, to Mr. Hugh Barclay of Regent Street for aiding my inquiries and for a fine specimen of the wax, and to Sir W. J. Hooker and Mr. Kippist for their assistance in endeavouring to identify Mr. Fortune's wax-tree.

(*cc*) *Description of the Empire of China, translated from the French of P. J. B. Du Halde.* Lond. 1741, vol. ii., p. 230.

(*dd*) *General Description of China*, 1788, vol. i., p. 442.

within varies from $\frac{1}{7500}$th to $\frac{1}{2500}$th. The majority of the cylinders, when divided transversely, are found to be of circular figure, but I have occasionally seen them slightly flattened on one side.

Fig. 1. Fig. 2. Fig. 3.



In fig. 1 you have a representation of the cylinders as seen under a power of 500 diameters. If the wax be heated on glass, it readily melts, when the temperature rises to 184° Fah.; and if examined in this state, the fluid mass is perfectly transparent and structureless. On cooling, however, it crystallizes precisely like spermaceti, as shown in fig. 2. I have also made a microscopical examination of the insects, but have not been able to discover as much of their internal organization as I could wish, in consequence of their dried and shrivelled condition. One of the most perfect specimens that I could select from upwards of a dozen which I took out of one of the rounded masses of wax before alluded to, is represented in fig. 4, this is its dorsal surface; fig. 5 is a representation of the abdominal surface of the same insect.

Fig. 4. Fig. 5.

It will be seen that it has six legs, and the body is full of wax. In one of these insects, which appeared more transparent than the rest, the circular aperture or mouth was more plainly seen than in the specimen represented by fig. 5, but from the injury all the insects had sustained I could not ascertain more of their intimate structure. Mr. Hanbury having, through the kindness of Sir W. Hooker, obtained some of the living cochineal from Kew Gardens,

brought me a specimen of the white matter with which the insects are surrounded, for comparison with that of the insect wax, and I find that it is composed of two distinct substances, one occurring in the form of filaments, and the other in minute oval bodies, which I shall term coccoons; these are about $\frac{1}{10}$ of an inch in the long, by $\frac{1}{3}$th in the short diameter. When these last were examined microscopically, they presented nearly the same structure as the insect wax, but the filaments were of two kinds, one which made up almost the entire bulk of the coccoon, was of small size, averaging $\frac{1}{20000}$th to $\frac{1}{10000}$th of an inch in diameter, whilst the others, which were met with in fewer numbers, and on the outside of the coccoon, were nearly of the same nature as those of the insect wax, the principal difference being, that they were of greater length and rather larger diameter, being on an average $\frac{1}{2000}$th of an inch. The tube in the interior was also larger in proportion to the diameter of the filaments. A few examples of both kinds of filaments are represented in fig. 3, the smallest being those of which the great bulk of the coccoon was made up. I found it was a difficult matter at first to moisten these coccoons, neither water, glycerine, nor turpentine answered for the purpose; but I subsequently ascertained that alcohol did it completely, and from most of these oval bodies which I have called coccoons, I have been able to extract a small insect; in one case the insect had wings, but all the others were without them. I concluded that this winged insect might probably be a young male coccus. The apterous insects were of a brown colour, but on carefully examining some parts of the white mass most free from coccoons, I discovered a number of red bodies about $\frac{1}{15}$th of an inch in diameter; these I concluded to be the young females, and their bodies were full of the beautiful and characteristic crimson colouring matter. On submitting a coccoon to the action of heat, I found that a portion of it would melt and crystallize on cooling, precisely like the insect wax, but the temperature required was much higher than 184°. In melting, all the tubular filaments disappear, but in the residuum there are numerous globules probably of an oily nature. I should think, therefore, that the insect wax of China and the white matter of the cochineal insect would turn out to be as nearly alike in chemical composition as they are in their minute structure.

Royal College of Surgeons, March 21.

PROVINCIAL TRANSACTIONS.

EDINBURGH CHEMISTS' ASSOCIATION.

A Pharmaceutical Meeting was held in the Rooms, 72, Princes Street, on Wednesday evening, March 16th,

J. F. MACFARLAN, ESQ., IN THE CHAIR.

The following papers were read:—

ON THE ADULTERATION OF OLIVE OIL, AND THE BEST MODE OF ASCERTAINING ITS PURITY.

BY MR. JOHN MACKAY.

The author states, that the present high price of olive oil has led to the extensive practice of its adulteration. Even purchasing from the importer affords no security for its genuineness, as it is frequently adulterated abroad.

The oils generally employed for adulteration are rape oil, cocoa nut, poppy seed, and gingelly or sesame oil; the first and the last being especially employed by the dishonest merchant for the purpose of mixing with genuine olive oil.

Mr. Mackay submitted samples of fine foreign rape oil, and also two samples of gingelly seed oil, both of which resembled olive in their physical characteristics, although only about a third of the commercial value of the pure oil. Hence the necessity of having some more certain and distinctive test than the eye, the nose, and the palate. In connexion with the subject, he stated, that a considerable quantity of the gingelly oil was sold under strange terms, such as *Italian oil, sceatless oil*, &c. &c., at a price very far above its market value. He then proceeded to describe the best mode for testing the purity of olive oil. This was based upon the experiments of Poutet, upon which the Edinburgh College has founded their test, as given by Professor Christison in his Dispensatory. He described the manner of making this detective solution as follows:

Mercury, ℥ss.
Nitric Acid, ℥iv.
Water, ℥vii

The mercury is to be slowly added to the nitric acid, either in a water-bath or upon a hot plate, and when the action has ceased, and the solution is perfect, the water is to be added. In this state the solution is fit for use. One part of the acid solution is to be added to two parts of the oil to be tested, in a bottle which is not more than three-fourths filled with the mixture, and the ingredients are to be shaken together for three or four minutes. The oil and acid solution do not mix very readily at first, but continued agitation produces a soapy fluid. After a period of ten minutes, the bottle is again to be shaken, and then left at rest for some hours, during which time the mass becomes solid if the oil was genuine.

Mr. Mackay showed the meeting ten different specimens of oil which had been subjected to the test, four being genuine and six adulterated, two with gingelly seed, two with cocoa-nut oil, and two with rape seed. In all these cases the genuine oil became a firm and consistent mass, while the spurious oils remained in a fluid state. He stated the test to be so minute that 5 per cent. of adulteration could be detected. Before concluding, he made a few observations upon the use of olive oil by the Turkey-red dyer, and drew the attention of the meeting to the striking and peculiar colours which the various adulterated oils showed when subjected to the action of the hyponitric acid test. The genuine oil gave a creamy colour, the nut oil a pale yellow, the gingelly a deep yellow, and the rape seed a deep orange approaching to red. By these various tests he suggested that the *kind* as well as the *quantity* of the adulterating medium might be detected.

OBSERVATIONS ON THE WATERY INFUSIONS OF THE PHARMACOPŒIAS, AND ON CONCENTRATED INFUSIONS.

BY MR. JAMES GARDNER.

The author stated that, so long as a hundred years ago, infusions were in medical works considered useful, elegant, and agreeable methods of giving bitters, tonics, and aperients. This praise, however, closed with the discouraging qualification that they are very apt to ferment, and thus become useless either in the stock of the apothecary or in the possession of the patient. He proceeded to state that his attention had been directed for many years to the concentrated infusion of senna and other similar preparations, and proceeded to give in detail the method he followed for obtaining the best concentrated infusions. This, he stated, consisted of taking of the materials ordered by the College as much as will be necessary to make any number of pints or gallons of the ordinary infusion—exhausting with cold or hot water as may be directed—straining and evaporating by means of steam applied to the bottom of shallow trays, or evaporating dishes, if the former are likely to be acted upon. The fluid should be evaporated to one-ninth part of the measure ordered by

the College, to which one-eighth part of rectified spirit is to be added. The concentrated preparations, when clear, can be poured off or filtered. One ounce of such a concentrated infusion, added to seven of distilled water, forms a mixture equal in strength to the ordinary infusions, of superior appearance, and possessing all its medicinal properties. In concluding his remarks, Mr. Gardner stated that he was perfectly aware of some makers having sent out several similar preparations, but, as far as he had opportunity of judging, they did not adequately represent the strength required by the College, which, he had no doubt, had not a little prevented their more general employment.

ON THE PREPARATION OF ETHER.

Mr. T. Roding, from Hamburgh, described an improved method of distilling sulphuric ether, and illustrated the same with diagrams showing the apparatus necessary for conducting the process. This consisted of a leaden still and head, with a glass tube attached in the usual way to the side of the still to indicate the quantity of liquid within, so as to facilitate the adoption of the well-known continuous process. He also entered with some minuteness into the chemical constitution of this substance, and concluded by stating the system he pursued for rectifying ether when prepared, and the tests he employed for ascertaining its freedom from adulteration.

The Chairman then addressed the meeting in terms of congratulation, in reference to the progress which has been made by the Association during the bygone winter months. This being the last scientific meeting of the Society for the present session, he hoped that, as some of the highest standing in the medical profession had kindly and liberally given the Society their countenance and support, by contributing useful, valuable, and instructive matter at the meetings, it would act as a stimulus to those connected with the Pharmaceutical Society in succeeding sessions, especially as, from and after May, they would be fully organized under the new Pharmacy Act, which would, in the course of a few weeks, come pretty fully into operation.

THE ANNUAL GENERAL MEETING OF THE NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY

Will be held on Monday, *4th April, at Twelve o'clock, noon,*

IN THE ROOMS 72, PRINCES STREET.

Business of the Meeting.—1. Report of the Committee for the year 1852-53.—2. Election of President and Vice-President for 1853-54.—3. Election of Examiners for 1853-54.—4. Appointment of Committee to act till next Annual Meeting.—5. Continuation of Mr. Macfarlan as representative at the Council Board in London.—6. Motion by Mr. Mackay.—"That it is expedient, in order to assist in carrying out the provisions of the Pharmacy Act, to render it imperative that all future Apprentices to Pharmaceutical Chemists in Edinburgh, Glasgow, Aberdeen, St. Andrews, and other places where lectures are delivered, shall attend at least one Course of Materia Medica and one Course of Chemistry; and resolve that this meeting strongly recommend an especial clause in each indenture to this effect."

PHYTOLOGICAL CLUB, IN CONNEXION WITH THE PHARMACEUTICAL SOCIETY.

The first General Meeting of the Club was held on the evening of March 7,

ROBERT BENTLEY, F.L.S., &c., PRESIDENT, IN THE CHAIR.

Several new Members were elected, and the following donations were announced:

Plants from the South Sea Islands, from Mr. E. H. May, Jun., Tottenham.

British plants, from Messrs. Copney, of Plymouth; Brady, of Leeds; Penney, Parker, and Reynolds.

In forwarding some dried specimens of Hymenophyllum Tonbridgense, Mr. H. B. Brady notices a new locality for this interesting fern, viz., upon sandstone rocks in a wood on the south side of the river Nidd, in the district of Birstwith, and about five miles from Harrowgate.

After the donations were announced,

The President delivered his inaugural address, of which the following is a brief abstract. He commenced by thanking the Members for the honour they had conferred upon him in electing him as their first President, and stated his determination to promote to the utmost of his power and ability the objects of the Phytological Club, and the Pharmaceutical Society with which it was in connexion. He then proceeded to speak of the utility of Botany to the Pharmaceutical Chemist, and the advantages to be derived from the establishment of the Phytological Club. Thus, it was from the vegetable kingdom that the majority of substances used as articles of the Materia Medica were derived, and in order to become acquainted with the species which yield them, a knowledge of Botany was requisite, to confirm the selection of the proper species; to detect fraudulent or ignorant substitutions; and to determine whether they had been collected at the period when their medicinal properties were fully developed. The President then dwelt for some time upon the advantages to be derived from the natural system of Botany to those Pharmaceutists who were led to visit other parts of the globe, as it would enable them to distinguish those plants which were harmless or nutritive from those which were poisonous or injurious, and by knowing the medicinal properties of the different natural orders, it would give them a clue in the search for new remedies from the vegetable kingdom. Thus, with very few exceptions, the plants of the Cruciferæ, Rosaceæ, Malvaceæ, Labiatæ, Gramineæ, and many others were harmless or nutritive, while those of the Fungi, Solanaceæ, Apocynaceæ, Ranunculaceæ, Papaveraceæ, Colchicaceæ, and others were suspicious. Then again to illustrate the medicinal properties of the natural orders: the Papaveraceæ, Cruciferæ, Guttiferæ, Simarubaceæ, Solanaceæ, Gentianaceæ, Coniferæ, Zingiberaceæ, and others were quoted, as in general exhibiting well marked properties throughout the entire plants of those orders, and thus a person previously acquainted with these properties would have an important clue in the search for new remedies from the vegetable kingdom. In some few instances it was observed, that exceptions might be brought forward of plants possessing different properties than those generally possessed by the order to which they belonged, but these were in general unimportant, and did not by any means essentially interfere with the general utility of the natural system of Botany, which was declared by Linnæus to be the "primum et ultimum in botanicis desideratum." Again, it was noticed that important aid might be given to the scientific systematist, in the formation ultimately of a perfect natural system, by such societies as the Phytological Club (which was especially established for the purpose of collecting and distributing plants, and for recording any interesting facts connected with their medicinal and other properties), for if it had not been originally for the working practical botanists, who wandered forth adventurously to all regions of the globe in search of the plants of those districts, no materials would have existed whereupon to have founded our present natural systems, and it was therefore to the combined labours of the collecting practical botanist and the more philosophic systematist, that we must look ultimately for the formation of a true natural system, to which no exceptions should exist. At the present day, it was too frequently the case that the collector of plants was looked down upon by his more philosophic brethren; but this ought not to be, for in all sciences we require men to collect facts, as well as others to digest and arrange them; those, therefore, who work by their untiring energy in amassing stores of information, ought not to be despised by the more philosophic systematist.

After having thus alluded to the advantages to be derived from a knowledge of the natural system of Botany to the travelling Pharmaceutist, the President

proceeded to illustrate its great use even in the limited area of the British islands. He said that a country which yielded so many important medicinal plants as our own was known to do, would probably be found, if properly searched, to contain many others; and even should this not be the case, it would at all events direct attention more particularly to the well-known virtues of our native plants, so that in case of war or otherwise, which should cause a scarcity of any of our important medicinal drugs, derived from foreign sources, we might look at home for substitutes; and there were no doubt many British plants not at present contained in the Pharmacopœias, or but rarely used, which would then come into demand; as for instance, many of the Gentianaceæ, as tonics; the Potentilla Tormentilla, as an astringent; the Acorus Calamus, as a stimulant, aromatic, and tonic; the Helleborus fœtidus and viridis, as drastic cathartics; the Nephrodium Filix-mas, as an anthelmintic; the bark of some of our Salices for their anti-periodic properties; and a number of others. These examples were quoted, not for the purpose of showing that they were in all cases equal to the foreign drugs of similar properties, but only to show, that in case of necessity, many of our hitherto but little used native plants might supply, to some extent at least, those derived from abroad. This Society, therefore, might render a great benefit, by directing the attention of its Members to the properties possessed by our native plants, as well as by affording a means by which the reputed local properties of indigenous plants might be made generally known.

Allusion was then made to the great assistance this Club would render to the Board of Examiners, the Professors, the Members, and Students of the Pharmaceutical Society, by the establishment of a herbarium of English and Foreign plants, to be open under certain restrictions to all members of the Society; and the President particularly requested that country members and others would at once send up specimens to the Phytological Club to supply this manifest deficiency. It was also stated that one of the primary objects of the Phytological Club was to distribute its duplicate specimens amongst its own members, by which a great service would be rendered. This object, however, could not be carried out till the club was in possession of a large number of plants, and donations, therefore, were much required.

Another great advantage, which it was hoped that this club would render to the profession generally, was then alluded to. This was, by the members in different parts of the country accurately observing the effect of climate, soil, and other circumstances upon the medicinal activity of plants; for it had been observed by Dr. Christison and others, that even within the limited area of the British islands, the same plant was liable to vary much in the quality of its secretions, according to the district from which it had been obtained. As this was a subject of great interest to the Pharmaceutical Chemist, who had constantly to make use of vegetable products in the operations of the laboratory, Mr. Bentley said he should be most happy to enter into correspondence with any gentleman respecting it. The matters which should be particularly noticed in investigating this subject were: the locality of the plant; whether growing in water, or on land; if the former, its chief constituents should be noticed; if the latter, the nature of the soil; and if the highest and lowest temperature, as well as the mean temperature of the year, as also the intensity of the light in that locality could be ascertained, these would be important guides in assisting us to draw practical conclusions therefrom.

The President also hoped, by the aid of the members of the Phytological Club, to do something towards determining the permanence or otherwise of many of our so-called native species; as he thought that there was too great a disposition among some of our systematic botanists to notice plants as distinct species upon unimportant characters. Many of these so-called species he believed to be nothing more than mere varieties, produced by difference of soil, and other peculiarities; but the only way of putting this matter to the proof, would be to collect such

plants from different localities, and place them under the same circumstances of soil, moisture, temperature, &c. Mr. Bentley said he should be most happy to undertake such an inquiry (which he had full opportunities of doing in the Gardens of the Royal Botanic Society), if the members would forward plants to him for this purpose, and then the results might be afterwards communicated to this club, and thus be generally made known.

The President then alluded to an objection, which had been frequently urged against Botanical societies like the Phytological Club, which were especially formed for the purpose of collecting and distributing specimens of our native plants: namely, that by them many of our rarer plants had been altogether destroyed, or lost from some of their former habitats. Mr. Bentley himself vouched for the accuracy of some facts of this description which had come under his own notice whilst residing at Tonbridge Wells some years since: he would therefore particularly caution the members of this Club not to lay themselves open to the same censure, but in all cases, upon finding a new locality for a rare plant, to be content with taking a single specimen of it, if there should be but few, or should there be but a solitary specimen, not by any means to destroy this, but merely to note the locality, for after inspection, by themselves or others, when probably it would be found that the single plant had propagated itself by seed, or otherwise, and thus a new and interesting habitat might become firmly established. The members of the Phytological Club were also cautioned as to publishing, except with great discretion, any new habitats they might discover for the rarer plants, or else these would immediately become visited by persons who make a trade in them; or by so-called Botanists, who care nothing for the science, further than to gratify their vanity by obtaining specimens of our rarer plants.

In conclusion, the President adverted to the irreparable loss the club had already sustained by the sudden and melancholy decease of Dr. Pereira, who had but a few short weeks before kindly allowed his name to be put on the list of Vice-Presidents; and Mr. Bentley said that he took that opportunity gratefully to acknowledge the invaluable advice and assistance which he had always received from the late Dr. Pereira whenever he had cause to apply to him; and he thought that one of his greatest claims to the respect of all young men, was his great desire to forward their interests to the utmost extent in his power, whenever an opportunity occurred.

At the conclusion of the address Mr. Bell alluded to the Pereira Memorial, and after some discussion it was resolved unanimously, "That in the opinion of this meeting, it is desirable that some memento of Dr. Pereira be obtained in connexion with the Pharmaceutical Society in addition to the Bust which it is proposed to place in the London Hospital."

Mr. Pennet then read a translation of a paper by M. Ville, published in the *Comptes Rendus* of Oct. 4th and Nov. 2nd, entitled,

EXPERIMENTAL RESEARCHES ON VEGETATION.

Whilst fifty elements enter into the composition of minerals, four only are necessary for the production of plants. These four elements are hydrogen, oxygen, carbon, and nitrogen. If we can determine with certainty the source whence plants derive each of these bodies, and the circumstances which regulate their absorption, we should possess every element for a complete theory of vegetable growth—a desirable result, but one which we are very far from having arrived at. We are often asked if the air, and especially its nitrogen, contributes to the nutrition of plants; and with regard to this latter gas we have always replied negatively. On the contrary, however, we know that plants do not obtain all their nitrogen from the soil. Every year the crops that a land produces contains more nitrogen than the manure which is applied to it. From what source, then, is the nitrogen of the crops, or, in more general terms, the nitrogen of plants which the soil has not supplied to them derived? This is the inquiry I have undertaken. When I say that we have never admitted that the nitrogen of the air contributes to the nutrition of plants, Priestley and

Ingenhousz must be excepted. These two philosophers have admitted, on the contrary, that the air is a condition of the life of plants; but their experiments, insufficient to solve this problem, were resumed and disproved by Théodore de Saussure. He summed up his criticisms and observations in the following words:—"If nitrogen be a simple substance, if it be not an element of water, we are compelled to admit that plants only assimilate it from animal and vegetable substances and ammoniacal vapours, and we cannot doubt the presence of ammoniacal vapours in the air, when we find that pure sulphate of alumina becomes changed into the ammoniacal sulphate of alumina." Th. de Saussure was the first who drew the attention of philosophers to the presence of ammonia in the air, and the first who assigned to it a place in the economy of plants. M. Boussingault has devoted two years to the study of this question, but instead of proceeding as Priestley and de Saussure, instead of analyzing the air in which a plant had been placed and determining the changes that it had produced in its composition, he reversed the experiment, he sowed a certain number of seeds of a known composition in earth deprived of organic substances. Every day the plant was watered with distilled water, and all the pots used in the experiments were shut up in a house at some distance from any dwelling. Experimenting under these new conditions, M. Boussingault has ascertained that plants absorb an appreciable quantity of nitrogen without stating precisely either under what circumstances or in what form the absorption of this gas takes place. "The researches that I have undertaken," he says, "appear, then, to establish that under many conditions certain plants are capable of imbibing the nitrogen of the air. But under what circumstances and in what form is it taken up by plants? Of this we are still ignorant."

Taking as his basis an opinion previously advanced by De Saussure, M. Liebig considers it a fact proved by the latest evidence, that the nitrogen of plants is derived from ammonia in the air, and this is the most generally received opinion at this time; thus, when plants absorb nitrogen from the air, it is in the form of ammonia.

Organic substances devoid of ammonia (NH_3) produce it during their decomposition. This is the result of the combination of the nascent hydrogen, which is given off, with the nitrogen of the air.

Mulder attributes all the nitrogen plants can derive from the soil to this source.

If we free for a moment the subject from all preconceived theories and every personal consideration, and if beginning again with the question with which we commenced: From what source do plants derive their nitrogen?—does the nitrogen of the air contribute to their nutrition? we desire to determine it by experiment; we should first ascertain whether the air contains any ammonia, and determine how much it contains, afterwards, whether a plant growing in soil deprived of organic substances, and at the expense of a known volume of air, finds in that air sufficient ammonia to account for the nitrogen it has absorbed. Lastly, if ammonia in the air occupies a place as important in the economy of plants as we claim for it, it will be interesting to observe what phenomena are produced by it, when we increase the amount the air already contains.

These three questions: 1. The presence of ammonia in the air and its amount; 2. The absorption of nitrogen by plants; 3. The effects of ammoniacal vapours on vegetation. These form the substance of the investigation of which it remains to me to describe the principal results.

1. The existence of ammonia in the air and its amount.—When we place a solution of sulphate of alumina in the air, it is converted into ammonia alum, proving without doubt that the air contains ammoniacal vapours. Since M. Th. de Saussure published this interesting observation, three attempts have been made to estimate the amount of ammonia in the air; for the first we are indebted to M. Grëger, for the second to M. Kemp, for the third to M. Frésénius.

According to M. Grëger, 1 million kilogrammes contain 333 grammes (5,138.19 grs.) NH_3 (2,679,000 lbs. troy).

"	" M. Kemp	3^,880	"	(59,880.04 grs.) "
"	" M. Frésénius	during the day ... 0,098	"	(1,502.14 grs.) "
		during the night... 0,169	"	(2,607.67 grs.) "

Of these three attempts, the last especially deserves our attention, for the care in every respect the author has taken; yet M. Frésénius, as his predecessors, has obtained, from not having taken a sufficient quantity of air, inaccurate results. For my own calculation, I have made sixteen determinations of the ammonia in the atmosphere, taking successively 20,000, 30,000, and 55,000 litres* of air. I must refer to my memoir † for the description of the apparatus.

In the years 1849 and 1850 I found that a million kilogrammes of air contained a mean of 366.15 grs., the greatest amount was 489.28 grs., the least 274.03 grs. In 1850 the mean was 325.57 grs., the greatest 420.62 grs., the least 254.90 grs. This will give as the result of these experiments a mean of 345.77 grs., the greatest amount being 447.47 grs., the least 264.47 grs.

2. Is the nitrogen of the air absorbed by plants?—To ascertain this a certain number of seeds were sown under a bell glass, so arranged that a known volume of air could be admitted daily by means of an aspirator. At the same time that the plants were growing under the glass the amount of ammonia in the air was estimated. From these two experiments made simultaneously we are able to deduce:—1. The amount of ammonia contained in the air that has passed into the glass. 2. The amount of nitrogen the plants have absorbed; and by comparing those two amounts determine whether the ammonia of the air has sufficed for this absorption. In 1849 there passed into the glass .029 gr. of ammonia, and the nitrogen of the plants exceeded that of the seeds by 1.604 gr. In 1850 there had passed into the glass .032 gr. of ammonia, and the nitrogen of the plant was in excess 18.33 grs. In 1851 another experiment was made, the air being freed from ammonia before passing in to the glass. Under these conditions the nitrogen of the plants has exceeded that of the seeds 7.42 grs. In this experiment two sunflowers flowered and produced ninety-five rudimentary seeds. Lastly, in 1852, an experiment made with wheat produced the same results; the plant fructified completely, and its nitrogen exceeded that of the seeds .335 gr. From these experiments we may draw the following new conclusions, viz., that the nitrogen of the air is absorbed by plants and contributes to their nutrition, and that the cereals form no exception to this rule.

3. The effects of ammoniacal vapours on vegetation.—On the addition of ammonia to the air vegetation exhibits a remarkable activity; in the proportion of $\frac{1}{5000}$ the effect of this gas becomes apparent after eight or ten days, and from that time manifests itself with a constantly increasing intensity. The colour of the leaves, which at first is a pale green, gradually deepens until it becomes very dark. Their petioles become long and straightened, and their surfaces extended and shining. At length, when the growth has reached its limit, we find that it has been much greater than that of the same plants growing in the air alone; we find also that in an equal weight they contain nearly double the weight of nitrogen. Thus the addition of ammonia to the air produces two effects on vegetation:

1. It favours the growth of plants.
2. It renders their produce more nitrogenized.

In 1850 the produce obtained in the air amounted to 990.45 grs., and that obtained in ammoniated air to 1698.22 grs.; the former contains 19.534 grs. of nitrogen, and the latter 66.549 grs.

In 1851 the produce obtained in the air amounted to 1060.349 grs., it contained 6.622 grs. of nitrogen, and in the ammoniated air to 2086.136 grs., and contained 23.160 grs. of nitrogen.

In 1852 thirty grains or corns of wheat produced in the air 182.990 grs. of straw and forty-seven grains or corns, which weighed 16.355 grs. In the ammoniated air the same number of corns of wheat produced 339.305 grs. of straw and seventy-five corns, which weighed 29.102 grs. The straw grown in the air contained 0.663 grs. of nitrogen, and that in the ammoniated air 2.545 grs. The corns obtained in the air contained 0.339 gr. of nitrogen, and those in the ammoniated air 1.002 gr.

Besides these general effects which ammonia produces, there are some others, which are more variable, and which depend on peculiar conditions, but which are equally worthy of interest. In fact, by means of ammonia we are able not only to accelerate vegetation, but also to modify its course, retarding the action of certain functions, and greatly exciting the development or the multiplication of certain organs. If the employment of this gas is not well directed it may occasion some unlooked-for results. Those which have happened in my experiments appear to me to throw an unexpected light on the mechanism of the nutrition of plants; they have taught me at least, at the cost of some pains, that ammonia may become the

* A litre = 60.56 cubic inches.

† *Comptes Rendus*, tome xxxi., p. 578, Oct. 21, 1850.

promoter of vegetation. It should be well understood that I speak only of vegetation in green-houses. I will speak afterwards of the extension which its employment is capable of receiving.

If we subject plants to the action of ammonia several months before their period of flowering, the vegetation presents nothing peculiar. It is more active than in the air, but it does not produce any disturbance in the succession of the phases that it has to pass through. It often happens that plants cultivated in the air do not flower, and that those grown in ammoniated air produce perfect fruit; but if we alter the conditions of the experiment, if we wait until the plant is on the point of flowering, to subject it to the action of ammonia, the phenomena are entirely changed. In this latter condition the flowering is arrested, and vegetation takes a new direction. It appears as if the plant repassed through the stage it had just completed; the stem shoots out and branches in all directions, it becomes covered with a great number of leaves, afterwards, if the season is not too far advanced, the flowering, suspended for a short time, commences again, but all the flowers are sterile.

If we make the experiment with a cereal, the fistulous stem of which does not permit the production of fresh branches, the manner of the phenomenon is modified; the growth of the stem, on the top of which the spike or locusta has formed, is arrested, and, from the collar of the root it sends off some true bunches of culms, which very soon exceed the parent stem. In this case the plant does not perfect any fruit.

All these phenomena are quite in accordance with the more general laws of physiology, indeed, all organized beings are subject to a law of compensation, which maintains a harmony between their functions and regulates the development of their organs. Whenever one organ is developed to an exaggerated degree, it is at the expense of another, and whenever one function is exercised with too much activity, it is at the expense of another function. If the organs of vegetation or nutrition, viz., the stem, branches, and leaves, are developed beyond a certain point, it is at the expense of the organs of reproduction; the flowers are sterile, the plant does not produce any fruit. In the preceding experiments the plant at the period of flowering has been subjected to the action of the vapour of ammonia—its influence has induced the formation of a certain number of leaves—this sudden formation of fresh foliaceous organs has destroyed the equilibrium between the functions of vegetation and those of reproduction, and the former have predominated over the latter.

The action of ammonia does not produce the same activity during every period of the life of plants, the effects are more marked from the germination to the period of flowering, than from this latter period to the maturation of the fruit. This difference is easily understood; until the period of flowering, all the activity of the plant resides in the foliaceous organs; if a favourable influence affects them, it causes the formation of a large number of leaves, which, being organs of absorption, add their effect to the cause which has produced them. From the commencement of the period of flowering, on the contrary, all the activity of the plant is directed to the organs of reproduction, some of the leaves wither and fall off, and those which remain are much smaller than the first; it follows then, that the surface of absorption is diminished. Again, at the period of flowering, the plant approaches the limit of its development. From these two considerations we can easily understand that the effects of the ammonia are less marked during the second period of the life of plants.

During the hottest period of summer, the ammonia may occasion some bad results, and we shall do well to suspend its use during the months of June, July, and August. The bad results that I have observed have always shown themselves under the same conditions, and the characters are so constant as to be a well ascertained phenomenon. They are most apparent in plants whose vegetation is advanced. The leaves become yellow, shrivel, and dry, although the atmosphere be saturated with moisture, the evil extends to some of the upper leaves, and the plant dies. This effect is the result of the destruction of the equilibrium occurring suddenly between the quantity of the elements absorbed by the leaves and roots. I will explain. Generally speaking, roots are designed to provide plants with mineral substances. If the absorption of these substances proceeds beyond a certain limit, plants are not able to assimilate all that they receive, and it forms a saline efflorescence on the surface of the leaves. If we have dry weather after much rain, we observe frequent examples of this kind of efflorescence upon the large leaves of the cucurbitaceæ. When, by a concurrence of circumstances, the activity of the leaves exceeds that of the roots, the absorption of organic elements should predominate. In the absence of

a sufficient quantity of mineral matter these elements have not sufficient employment, then a remarkable phenomenon occurs—what the roots have not power to supply to the plant it takes from itself; there is a re-absorption of the substance of some of the leaves. In nature we often observe examples of this kind of re-absorption of the older for the benefit of the more recently formed organs. If we gather a plant of purslane when it is in flower, and put it in the shade upon a sheet of paper, the vegetation goes on, and the seeds form and ripen. Now in this particular case the mineral substances contained in the seed could not come from the soil, they must then come from the tissues of the plant. The bad results that I describe present a phenomenon of the same kind.

From all these facts I shall draw the following conclusions as I have stated at the commencement:

1. In the proportion of $\frac{1}{1000}$ the addition of ammonia to the air gives a remarkable activity to vegetation.

2. The produce obtained under these conditions, in an equal weight, contain more nitrogen than that of the same plants grown in the air.

To these conclusions I will add, that there are periods to be chosen for the employment of the ammonia, during which the influence of this gas shows itself by its different effects, and hence two new deductions:

1. If we begin the employment of the ammonia two or three months before the period of flowering of plants the vegetation follows its ordinary course, and it does not produce any disturbance in the succession of the phases that it passes through.

2. If we commence the employment of this gas at the period of flowering this function is arrested or retarded, the plant becomes covered with leaves and does not produce any fruit.

The following interesting remarks, confirmatory of the results obtained by M. Ville, were then read from Mr. Deane, Vice-President of the Pharmaceutical Society:

Effects analogous to those produced by M. Ville with ammoniated air on the leaves of growing plants, have been observed by me, as the results of applying solutions of ammoniacal salts to the roots.

My attention was first effectively turned to the subject about eight or ten years since, when an extensive grower of pelargoniums, fuchsias, and roses, applied to me for some remedy for a sickly condition of his stock; which, if left unchecked, would insure a very severe loss to him. On examining the plants they were found to be in a starving condition, the roots having filled the pots and exhausted the soil; consequently, the leaves had lost their healthy green colour and become very pale with a strong tinge of yellow, the lower leaves were quite yellow, spotted, and falling off. The natural remedy was obviously fresh potting, but as the plants were already in the pots best adapted to answer the purposes of the grower, some other remedy had to be devised. I therefore made a very weak solution of sulphate and carbonate of ammonia, and therewith watered the roots of the plants once a-day, in the evening; and to insure any observed results as to the effect of the ammonia, certain rows of the plants on the stage of the greenhouse were selected for the experiment.

In a few days the effects of the ammonia were most marked and satisfactory. The leaves began to put on a very remarkable appearance, the course of the veins, or spiral vessels, becoming perfectly green, the colour commencing at the basal portion of the midrib, and thence spreading through all the reticulations, until the tissues were perfectly restored to their normal and healthy condition; and, in fact, the plants thus treated, looked more vigorous than they had ever done before, being much darker in colour and firmer in texture. The contrast between these plants and those which had received no ammonia left no doubt about the efficiency of the application.

I forget the effects upon the flowering of the pelargoniums, but there was certainly no deficiency of flowers on the fuchsias and roses; they were, moreover, finer and better coloured than usual.

On a subsequent occasion a gentleman's gardener applied to me in a similar dilemma; he had a house full of fancy pelargoniums preparing for a flower-

show, at which he expected to take the first prize. Just as the trusses of flower buds were emerging, and there was every prospect of a good bloom, the lower leaves of the plants began to turn yellow and spotted, and then to fall off, leaving the plants bare where the foliage was considered an essential point of beauty. I examined the roots and found them nearly filling the pots, it was therefore evident there was not sufficient nutriment left in the pots to meet the extra demand made by the large number of flower-buds; the latter were, consequently, deriving their nourishment from the leaves—the natural storehouse of the food of plants during the growing season—and of course exhausted the lower leaves first. They were treated precisely as in the former instance, and with the same results, the lower leaves became healthy, and the flower-buds progressed favourably to maturity, being of good form and colour.

The success of these experiments became known to other gardeners in the neighbourhood, some of whom were equally successful, while others did not derive that satisfaction from the use of the ammoniacal solution, either from not understanding the principle of its application, or from a desire to accomplish more than they were capable of, when it frequently happened the plants became too vigorous to flower well.

There is no doubt but that M. Ville is correct in stating that the flowering is arrested if the application of ammonia is made at a certain period of the development of the flower-buds. Few plants if grown too vigorously will flower well, if at all. A certain check in their growth is absolutely necessary, and the summer's sun or winter's cold, under ordinary circumstances, effects this perfectly in this climate—the former by perfecting and condensing the elaborated sap, and the latter by arresting vegetation altogether. Too much moisture and shade cause those parts intended for flower-buds to be developed as leaves. In the Aloe tribe when the flower-stem is thrown up, it is at the expense of the outer leaves, the elaborated juices of which it appropriates, the roots at this time not being in action, because it is towards the close of a long period of dryness. If when the flower-stem is beginning to rise the roots are watered, all further development of the stem is arrested, the leaves only being developed. The same thing takes place with many bulbs whose period of flowering is not the same as that for leafing. Many Cape bulbs follow this law; for example, the Hæmanthus, the flowering of which is at the expense of some one or more of the outer coats. If these plants are watered at the wrong period, or if they have not had that proper rest which nature designed they should have under the influence of a roasting sun, such as their native country affords, no flowers will be produced, but in their stead a vigorous development of leaves.

It would appear, therefore, that the arrest of development of the flowers and fruits of the plants treated with ammonia is not so much the result of any specific property possessed by this substance, as by its bringing about artificially those conditions which may occur naturally, or be produced by other means. Also, that the application of ammonia to plants may be attended by results varying according to the conditions under which it is applied, and the object it is desired to attain.

The following is the formula for the solution alluded to in the previous note by Mr. Deane:

Sulphate of ammonia	7000 grains	
Sesquicarbonate ditto	1000 "	
Water	80 fl. oz.	Dissolve.

Of this solution one fluid ounce to a gallon of water will make a solution sufficiently strong for all ordinary purposes.

After the reading of this paper the thanks of the Meeting were unanimously voted to the President for his address, and to Mr. Deane and Mr. Penney for their respective papers.

The President then announced that the next General Meeting would take place on Monday, April 4th, at a quarter to 9 P.M.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE PREPARATION OF EXTRACT OF COLOCYNTH AND COMPOUND COLOCYNTH PILL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—I observe that it has not occurred to any of your correspondents on the subject of the preparation of extract of colocynth, that there is most probably an error in the quantity of water ordered in the Pharmacopœia of 1851, for the maceration of the colocynth pulp, *pounds* being put for *ounces*, for, by substituting the latter weight for the former, the relative proportions of colocynth pulp and water are the same as in the Pharmacopœia of 1836, and this supposition does away with all the difficulty about this preparation. I subjoin the two formulæ:

"1836. Colocynth pulp, 1 lb. troy (12 oz.); water two gallons (or 3 oz. to half a gallon.)"

"1851. Colocynth pulp, 3 lbs. (3 oz.?) troy (36 oz.); water half a gallon."

It is my impression that the College intended to reduce the quantity of extract of colocynth to be made at once in the Pharmacopœia of 1851, as they reduced the quantity of pilula colocynthidis composita to be prepared at a time, and thus to make the relative proportions of these two preparations harmonize better, ʒj. being only ordered of the extract of colocynth to be used at a time; and in effecting this reduction, a mistake has been made, and subsequently overlooked. I think such a supposition more probable, than that they should have intended to order a quantity of water insufficient to thoroughly wet the pulp, and not enough to extract one-fourth of its virtue.

Thinking this to be the intention of the College, I have frequently prepared the extract in this manner since the Pharmacopœia of 1851 was published, and find this proportion of water a very good quantity (certainly not too much); I find it produces each time about the same quantity of extract, and very much prefer the extract thus made by maceration in cold water, to that prepared by boiling the colocynth as in the Pharmacopœia of 1836, which I have frequently made, and which produces a large quantity of extract, but the process of ebullition so assimilates the pulpy matter with the liquor, that it is difficult to say whether the produce may not in some measure consist of *potted colocynth pulp* mixed with the pure extract; and it appears to me that your correspondent, Mr. Whipple (March number, page 423), must have prepared his extract in this way, and thus obtained the large produce he mentions; and I think it probable that the resinous substance of which he speaks is the pure extract diffused among the pulpy matter, which is smoother, and not disposed to combine with it.

In making the extract, it is a good plan to envelop the pulp after maceration in a canvas bag, made of the same material as that used for worsted work (I have tried most kinds of canvas and found no other answer so well); and having placed it in a press and gradually expressed the liquor, to strain it through a coarse flannel bag, thus separating any particles of pulp and leaving only the pure liquor for evaporation. This produces a beautiful extract, which is smooth and uniform; but as I find, if evaporated to a pill-consistence only, it will not keep long, I continue the evaporation in a water-bath to perfect dryness, in which state it keeps any length of time, and when used I allow one part in eight for moisture to make it of a pill consistence. The produce of this dry extract is from twenty-five to thirty per cent., supposing the pulp freed from seeds, of which I have sometimes found nearly two-thirds of the weight of the colocynth pulp, as bought, consisted, the average being rather more than half the weight of seeds. This produce of extract, adding one part in eight of moisture, is about one-third of the colocynth used, and is the same as that obtained by Mr. Squire, and calculated on by the College in their alteration of the formula for the extractum vel pilula colocynthidis composita, and is a proof that my supposition, with regard to the error in the proportions of water and colocynth pulp, is correct.

I have found the compound colocynth pill made from the extract thus prepared as nearly as possible the same strength as the compound extract of the Pharmacopœia of 1836, which always appeared to me to be the intention of the College, and which Dr. Farre's letter in your Journal states *is* the case. I conclude that extract of colocynth of *pill consistence* is intended in making the pil. coloc. co., and consequently in using the dry extract allow one part in eight for moisture, as I before mentioned; but had

extractum colocynthidis *Durum* been ordered, it would have ensured greater uniformity in the pilula colocynthidis composita, opinions differing with regard to pill consistence. Before making the extract of colocynth (if evaporated to dryness) into pilula colocynthidis composita, it is a good plan to let it soften in a little cold water for twenty-four hours before mixing it with the other ingredients.

It is to be regretted, now that no specific weight of colocynth pulp is ordered to be used to a given quantity of compound extract of colocynth, as in the Pharmacopœia of 1836, that the College continue the instructions for the seeds to be separated from the pulp, more especially now the pulp is macerated in cold water. I have made some experiments, and find that the seeds do not give out any mucilage, extractive, or other matter, during their thirty hours' maceration in cold water, and consequently may be regarded as so much inert matter diffused among the pulp, and not in the least affecting the produce of the extract. It was a very different thing in the former Pharmacopœia, where a given quantity of pulp was ordered in a given quantity of compound extract of colocynth; then it was highly important, now the separation of the seeds is so much labour thrown away; and is is the most unpleasant work I know of in the whole routine of Pharmaceutical employment.

I take this opportunity of making the remark that, when I first saw the formula for extract of colocynth in the Pharmacopœia of 1851, and observed so little water ordered for the maceration of the pulp, I concluded that some *fresh* colocynth fruit had been imported, and that the pulp of this was intended to be used in future. Some of your readers may smile at this; but as the Pharmacopœia is now worded it certainly seems the proper construction to be put upon it; for on referring to the Materia Medica it will be found that the term *Fructus decorticatus* (*siccus* being omitted) is used; and in the formula for making the extract the words *Colocynthidis conciser* instead of *contusis* (for who would think of *cutting dry* colocynth pulp to extract the seeds?); and then again in the directions *manus comprimens*; and adding to these the small quantity of water ordered, the terms employed are all favourable to the supposition that *fresh* colocynth pulp was intended to be used; and it was only on making every inquiry and finding that such a thing was not to be obtained, that I was satisfied that the dried pulp was intended as before.

Hoping the above will not take up too much of your valuable space,

I remain, Sir, yours truly,

WILLIAM MARKHAM COLCHESTER.

2, *Crown Street, Hoxton Square, London, 8th March.*

ON KINO.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—I venture to trouble you with a few remarks on the subject of Kino, lately opened again in your Journal by the able pen of Professor Christison, of Edinburgh.* The Professor rightly suggests that the name *kino* should be applied to the natural exudation only, but I fear that this may be often practically impossible when the extract is thickened (as it easily may be) by the steady action of the sun's rays on the partially boiled material placed in shallow vessels. I may also state, that the effect of atmospheric oxydation tends speedily to convert the finest shining grained kino to the more dingy hue which characterizes the highly boiled extract.

Of Butea kino (natural exudation) I sent home through the Agricultural Society of Bombay to the Asiatic Society in London about 40 lbs., and I have little doubt but that if search be made, this and other extracts, whereof I never received any notice whatever, may be heard of. This kino may be compared with other specimens, as may also an extract prepared from the *Syzigium Jambolanum*, which I sent in the same despatch. A natural exudation apparently identical with the best kino, is formed though sparingly in and on the bark of the *Zizyphus Jujuba*, *Z. Œnoplia*, &c.; also more abundantly in the bark

* See page 377.

of *Dalbergia Oojeinensis*. In the same despatch I think was a tin tube partially filled with an extract made from the bark of *Acacia Arabica*. This was sent with the view of trying its value as a tanning material.*

As I am about to leave Europe, and may thus not have the means of soon communicating again with the Society, I beg to notice another subject which may be of interest to the Members; I mean that of leech breeding.

In 1837 I published in the *Bombay Medical Transactions* an account of the mode of breeding this valuable animal, as extensively practised in many parts of the Bombay Presidency, and I suspect, in many other parts of India. Now it is of importance that this branch of medical economy should be made as public as possible, seeing, that though even if the English climate may not be found suitable for the breeding of the leech, that of many of our colonies may be so, and thus an immense annual saving in hospital expenses might be effected. In this view I beg to recommend the re-publication of my short paper on the subject in your valuable Journal. At present it lies entombed in the first volume of the *Transactions of the Medical and Physical Society of Bombay*, a book the existence of which must be unknown to very many of your readers, but a copy may be found in the libraries of one or more of the medical associations of London.

I have the honour to be, &c.,

Near Boulogne, 17th Feb., 1853. ALEXANDER GIBSON.

[We have referred to and perused Mr. Gibson's *Letter on the Manner of Breeding Leeches practised in the Deccan*, contained in the above-mentioned *Transactions*, but as the substance of it has already appeared in this Journal (vol. vi., p. 259) in a paper by Mr. J. Sparks *On the Method of Breeding and Rearing Leeches in Scinde*, we think it unnecessary to reprint it.

At the same time we thank our Correspondent for having drawn our attention to the subject, and give him full credit for priority in describing the curious mode of propagating the leech pursued by the natives of India.—ED. *Pharm. Journ.*]

ON A MEANS OF DETECTING THE ADULTERATION OF OLIVE OIL.

In common with all oils, that of the olive evolves heat when mixed with concentrated sulphuric acid, and Maumené† recommends its use as a means of detecting the admixture of other oils with olive oil. He states that his experiments upon all kinds of pure oils have shown that olive oil is remarkable in evolving less heat when mixed with this acid than any other oil with which it is likely to be adulterated. The reaction may be observed in the following manner:—Fifty grammes of pure olive oil are placed in an ordinary test-glass, the temperature observed, and ten cub. centimes of sulphuric acid (1.834 sp. gr.) carefully poured into it. The liquids are then mixed by stirring them with the thermometer and the increase of temperature observed. When the initial temperature of the oil and acid is 77° F., the thermometer rises to 153° F. upon their mixture—an increase of 76°. The mixture does not occupy more than two minutes, the maximum temperature is attained in one.

In another glass of the same kind, fifty grms. of poppy oil are placed and treated in a similar manner. The increase of temperature in this instance will amount to 134° F. Further, there is a very distinct evolution of sulphurous acid not produced with olive oil, and the liquid swells up considerably. The number 134° is therefore too low in consequence of these two circumstances, but the difference between 76° and 134° is still sufficient to serve as a means of distinguishing between the two oils.

Repeated experiments made under similar conditions upon olive oil, showed that

* A paper by Dr. Royle on the resinous exudation of *Butea frondosa*, and also reference to a considerable quantity having been obtained by Dr. Gibson, will be found in the *Proceedings of the Committee of Commerce and Agriculture of the Royal Asiatic Society*, 1838-9, pages 50 and 128.—ED. *Pharm. Journ.*

† *Chemical Gazette*, 247, from *Comptes Rendus*, October, 1852.

the action of sulphuric acid is constant when the oil is pure, and when the operation takes place at the same temperature.

The action of this acid upon poppy oil is not less constant. Oil of ben and oil of suet evolve pretty nearly the same amount of heat as olive oil, but neither of these can be mixed with olive oil.

It is probable that with the aid of a few preliminary experiments this reaction may be of service in detecting the amount of adulteration of commercial olive oil.

PREPARATION OF MERCURIAL OINTMENT.

Mideat* describes a process by which this ointment may be made in a very short time. He recommends the following proportions:—Mercury, 500 ounces; fresh lard, 500 ounces; sweet oil, 20 ounces.

The mercury and oil are to be rubbed together for five or six seconds in a marble mortar, by which means the former is instantly reduced to a very fine state of division. The lard, previously melted, is then to be added in small quantities while the whole is being well mixed, and in ten minutes the operation is completed. It is unnecessary to use old lard, which always yields an objectionable preparation.

If the agitation of the mercury and oil is continued for more than five or six seconds, the former again aggregates into one mass, and the preparation of the ointment as above directed becomes impossible. The same difficulty attends the substitution of olive oil for sweet oil. The use of a metal mortar must be avoided.

OPIANINE, A NEWLY-DISCOVERED ALKALOID.

This alkaloid exists in Egyptian opium, and was discovered under the following circumstances: A pharmaceutist in Vienna having had occasion to prepare morphine from this opium, found that the morphine was mixed with a large quantity of crystals presenting the appearance of narcotine. Upon dissolving the mixture in hot alcohol, the crystals separated on cooling, and the morphine remained in the mother-liquor.

Hinterberger† has examined this crystalline substance, and found that it is a new alkaloid for which he proposes the name opianine. It crystallizes in long, colourless, transparent, and brilliant needles. It is precipitated by ammonia from its solutions as a white, impalpable powder. It is insoluble in water, very sparingly soluble in boiling alcohol, from which it separates entirely upon cooling. It is inodorous; its alcoholic solution possesses a strong and persistent bitter taste, and a marked alkaline reaction. Solutions of its salts give a white, flocculent precipitate of opianine on the addition of fixed or volatile alkali. The hydrochlorate of opianine forms double salts with chlorides of platinum and mercury. Opianine is unaltered by concentrated sulphuric acid; nitric acid dissolves it with a yellow colour. Sulphuric acid containing nitric acid communicates a blood-red colour, which after some time becomes bright yellow. The composition of opianine is expressed by the formula

$$C_{22}\ H_{23}\ N_2\ O_{10}$$

deduced from the analysis of the isolated base, and verified by that of the double salt formed with chloride of mercury $=C_{22}\ H_{23}\ N_2\ O_{10}$, HCl, HgCl.

Hinterberger's experiments show that opianine is a narcotic poison, closely resembling morphine. The effects produced upon two cats by equal doses of morphine and opianine were precisely similar.

ON SYRUP OF PYROPHOSPHATE OF IRON.

BY E. SOUBEIRAN.

Pyrophosphate of iron and soda has been introduced into the practice of medicine as having amongst other advantages that of being easily supported by persons unable to take the other preparations of iron. I had occasion to see two sick persons under these circumstances. They had had prescribed for them the solution of the pyrophosphate, according to the following formula:

Take of	Dry sulphate of iron	92 grains
	Crystallized pyrophosphate of iron	848 grains
	Water	q. s.

F. S. A. thirty-five ounces of solution.

This liquid has a saline disagreeable flavour, and to remedy this, I have prepared the syrup of which I propose giving the formula, and which is taken without any difficulty by women and children.

I must, in the first place, mention that the pyrophosphate of soda is prepared by drying ordinary phosphate of soda, and fusing it at a red heat; the mass then dissolved in boiling water, and the solution filtered and crystallized. By these means a salt is obtained, having for its formula $2\ Na\ O + PO_5 + 10\ Aq$. It contains 40 per cent. of water of crystallization. It may be distinguished by its forming a white precipitate with salts of silver, instead of the yellow precipitate which is formed by the ordinary phosphate of soda.

The pyrophosphate of iron corresponds to the preceding salt. Its formula is $2\ Fe_2\ O_3 + 3\ PO_5$. It is obtained by double decomposition from persulphate of iron and pyrophosphate of soda. It is insoluble in water, but soluble in pyrophosphate of soda.

I now come to the syrup of pyrophosphate of iron:

Take of	Persulphate of iron	55.4 grains
	Water	924 grains

This is to be slowly dissolved, which sometimes occupies two or three days, but it is preferable to put it into a flask, and to dissolve it in a water-bath.

Then take of	Crystallized pyrophosphate of soda	462 grains
	Pure water	℥vij ℥vj
	Distilled peppermint water	℥iiss

This is to be dissolved cold or at a gentle heat, and then to the cold solution is to be added the previously described solution of persulphate of iron. At the moment of admixture, a precipitate is formed, which however soon dissolves; the liquor is to be filtered, and one pound five ounces avoirdupois of fine white sugar added.

Dissolve without heat in a glass vessel. The solution must be made without heat, or at least at a temperature not exceeding 122° Fahr., as otherwise the syrup would assume the colour of wine dregs, and become very dark when heated at from 160° to 180° Fahr.—*Journal de Pharmacie.*

ON A NEW CYANOMETRIC PROCESS.

BY MM. FORDOS AND GÉLIS.

The cyanide of potassium of commerce is never pure, and even the pure substance alters by keeping. There can therefore be no doubt as to the utility of some means for readily determining its value. In many technical operations success or failure, and in medicine even life or death depend upon the knowledge of the actual percentage of cyanide in the commercial substance.

The process proposed by the authors is founded upon the reaction of iodine upon the cyanides, which has been studied by Serullas and Wöhler. It consists in the formation of iodide of the metal, and iodide of cyanogen—$K\ Cy + 2\ I = KI + Cy\ I$.

When a solution of iodine is poured into a solution of a cyanide, the iodine is absorbed, and the whole remains colourless until the precise moment when there is a minute excess of iodine present; it is this circumstance which MM. Fordos and Gélis have taken advantage of for the examination of cyanide of potassium by the method of volumes. Their mode of operation is as follows:

A known weight of the cyanide is dissolved in a definite volume of water, introduced into a glass flask, and diluted with water containing carbonic acid. An alcoholic solution of iodine of a known value is then added from a graduated burette until the liquid assumes a faint and permanent yellow tinge. A simple proportion then gives the percentage of cyanide in the substance examined.

The reaction of iodine upon the cyanide is sufficiently definite, the resulting products sufficiently stable, and the point at which the equivalent quantity of iodine has been added sufficiently obvious to admit of very accurate results being obtained by means of this process.

* *Repertoire de Pharmacie*, January, 1853.

† *Annalen der Chemie und Pharmacie*, Bd. vi., 311.

The authors have satisfied themselves that none of the impurities likely to be present in the commercial cyanide react upon iodine, and the error which might result from the possible presence of free potash, they obviate by converting it into bicarbonate, which is altogether without influence upon iodine under the conditions of the experiment.

In some instances the cyanide contains sulphurets, and their presence is always indicated at the close of the operation by a turbidity in the liquid, which ought to be perfectly clear. A fresh experiment must then be made, and the sulphuret previously removed by the addition of a few drops of sulphate of zinc or acetate of lead and filtration.—*Journ. de Pharmacie et de Chemie*, January, 1853.

ON THE OCCURRENCE OF BERBERINE IN THE COLUMBA WOOD OF CEYLON, THE MENISPERMUM FENESTRATUM OF BOTANISTS.*

BY JAMES D. PERRINS, ESQ.

The following investigation was made in the chemical laboratory of St. Bartholomew's Hospital under the immediate supervision of Dr. John Stenhouse. Dr. Stenhouse having had for some time past a quantity of wood of the *Menispermum fenestratum* in his possession, suggested to me this investigation. I am anxious, therefore, to acknowledge my obligation to him, not only for the material, but also for several valuable suggestions in the course of the inquiry.

Hitherto the chief source of the alkaloid berberine has been the root of the barbery, *Berberis vulgaris*. Bödeker, however, about four years ago, ascertained its existence in the Columba root of Pharmacy, the *Cocculus palmatus*, where it occurs in small quantity associated with columbine.

The following remark is made in the *Chemical Gazette* for 1849, vol. vii., p. 150:

"The occurrence of berberine in *Berberis* and *Cocculus* is remarkable in a physiological point of view. Bartling places both of these families, the Menispermaceæ and Berberideæ, in the class of the Coccalineæ, which is in accordance with the fact of both containing the same principle."

As berberine has now also been found in another of the Menispermeæ, the accuracy of Bartling's view seems to be greatly confirmed.

The following was the process adopted for the extraction of berberine from the *Menispermum fenestratum*. A quantity of the wood, which had a bright yellow colour resembling that of quercitron, was rasped, and then treated with successive portions of boiling water till it had become nearly tasteless. The aqueous decoction acquired a deep yellow colour and an intensely bitter taste. It was next evaporated carefully to the consistence of an extract, then introduced into a flask and boiled with ten or twelve times its bulk of rectified spirit of wine, filtered while hot, and the residue boiled with a further quantity of spirits, which dissolved the berberine, and also a quantity of resinous matter by which it was accompanied. The alcoholic solution was then introduced into a retort, and the spirit carefully distilled off, until the residue on agitation appeared to have nearly the consistence of oil of vitriol. It was then set aside in an open vessel, and in the course of twenty-four hours the liquid became filled with a mass of impure crystals.

After draining off the mother-liquor, these crystals were washed with a small quantity of cold spirit, redissolved in boiling alcohol, and set aside to crystallize. Their complete purification was attempted by repeated crystallizations. It was found, however, that a small quantity of resinous matter adhered obstinately to the crystals, causing them to remain of a brownish yellow colour. This brownish tint was ultimately entirely removed by solution in spirit of wine and digestion with a little purified animal charcoal, the pure berberine crystallising from the solution in beautiful bright yellow needles. The crystals were found to contain nitrogen, and their behaviour with various reagents corresponded exactly with those of berberine.

As these crystals were very soluble in boiling water, a quantity of them was dissolved in that menstruum; and on the addition of the requisite amount of hydrochloric acid, a crystalline precipitate was immediately obtained in the form of long, slender, golden-coloured needles, of a fine silky lustre.

This salt was dried in a water-bath at 212° F., and subjected to analysis with the following results:

* A full account, with drawing of transverse section of *Columba wood*, by Mr. D. Hanbury, is contained in the *Pharmaceutical Journal*, vol. x, page 321.—ED. *Pharm. Journal.*

6.25 grs. ignited with chromate of lead, gave 14.398 grs. of carbonic acid and 3.2 grs. of water.

The nitrogen was determined by Wills's method. 8.18 grs. of salt gave 4.94 grs. of the double chloride of platinum and ammonium.

The chlorine was determined as chloride of silver. 3.59 grs. gave 13.5 grs. of chloride of silver.

Hydrochlorate of Berberine.

	Calculated numbers.	Found numbers.
42 equivs. Carbon	3150...62.75...	62.79
20 equivs. Hydrogen	250... 4.98...	5.67
1 equiv. Nitrogen	177... 3.53...	3.78
1 equiv. Chlorine	442... 8.85...	9.02
10 equivs. Oxygen	1000...19.90...	
	5019 100.00	

These results correspond pretty closely with the formula of hydrochlorate of berberine, which, when dried at 212 F., contains one equiv. of water, and is consequently $C_{42}\ H_{18}\ NO_8,\ HCl \times HO$.

The hydrogen in this determination is considerably too high, which, however, is easily accounted for, as the hydrochlorate of berberine, after being dried in the water-bath, is eminently hygroscopic, and consequently absorbs moisture rapidly, while being mixed with the chromate of lead. This observation has already been made by Fleitmann, who, while analysing this salt, obtained an equally great excess of hydrogen.

A quantity of the double platinum salt was also prepared by mixing a solution of the hydrochlorate of berberine with one of chloride of platinum. The compound obtained corresponded precisely in its appearance and properties with the salt prepared in the same way by Fleitmann.

2.80 grs. of salt gave 0.49 gr. of platinum = 17.5 per cent., the calculated quantity being 17.55 per cent.

A small quantity of the acid chromate of berberine was also prepared by adding a solution of bichromate of potash to one of hydrochlorate of berberine. The salt which precipitated likewise perfectly agreed in its properties with the acid chromate examined by Fleitmann.

The results of these analyses and reactions leave no doubt as to the identity of the alkaloid, and also serve to corroborate the correctness of Fleitmann's formula for berberine, which I briefly subjoin:

Berberine, crystallized at the ordinary temperature, $C_{42}\ H_{18}\ NO_8 + 12HO$.

Berberine dried at 212° F., $C_{42}\ H_{18}\ NO_8 + 2HO$.

The hydrochlorate dried at 212° F., $C_{42}\ H_{18}\ NO_8 + HCl + HO$.

Double chloride of berberine and platinum, $C_{42}\ H_{18}\ NO_8 + HCl + PtCl_2$.

The *Menispermum fenestratum* is, according to Ainslie, a large tree, which is very common in Ceylon, and an infusion of which has long been employed by the Cinghalese as a valuable tonic bitter.

Gray, in his *Supplement* to the Pharmacopœia, informs us that this tree is known to the Cinghalese by the names of Weniwol and Bangwellzetta.

Berberine may easily be obtained in very considerable quantity from Columba wood, the whole of which it pervades, and of which it is the colouring principle; and if, as I suspect, the resinous matter accompanying it consists chiefly of altered berberine, improved methods of extraction, such for instance as the employment of a vacuum pan apparatus, would in all probability still further augment the amount of product.

I am informed that berberine is employed as a remedial agent on the continent, but its scarcity seems hitherto to have prevented its introduction into the medical practice of this country. As a good source for it has now been pointed out, it may be expected that berberine will take its place with the other alkaloids in our Materia Medica.

To prevent misconception from the similarity of names, it may perhaps be well to remark, that berberine and berbeerine are very different substances; the latter being the active principle of the bark of the bebeeree tree of Guaiana, and as yet has not been obtained in a crystalline form.—*Philosophical Mag.*, August.

St. Bartholomew's Hospital, July 20, 1852.

ON THE PERIODIC RETURN OF THE MINIMUM OF SUN-SPOTS; THE AGREEMENT BETWEEN THOSE PERIODS AND THE VARIATIONS OF MAGNETIC DECLINATION.

BY ROD. WOLF.

Since the time when the Academy was pleased to take an interest in my observations establishing a relation between sun-spots and terrestrial magnetism, I have continued the study of these phenomena, and have examined at least four hundred volumes, in order to make myself acquainted with all the observations of sun-spots. The result is a memoir, which I shall shortly complete, the contents of which appear to me of sufficient importance to warrant my presenting a brief report of them. The memoir is divided into six sections, as follows:

In the first chapter it is proved, by means of the six different epochs established by the minimum and maximum of sun-spots, that the mean duration of sun-spots may be fixed at 11.111 = 0.038 year, so that nine periods are exactly equivalent to a century.

In the second chapter it is proved, that in each century the years 0.00, 11.11, 22.22, 33.33, 44.44, 55.56, 66.67, 77.78, 88.89, correspond to the minimum of sun-spots. The interval between the minimum and the succeeding maximum varies. The mean is five years.

The third chapter contains an enumeration of all the observations of sun-spots from the time of Fabricius and Scheiner to Schwabe, always placed parallel with my periods. The agreement is astonishing.

The fourth chapter establishes the remarkable analogies between the sun-spots and the variable stars, from which it may be admissible to infer an intimate connexion between these singular phenomena.

The fifth chapter demonstrates that my period of 11.111 years coincides still more exactly with the variations of the magnetic declination than the period of ten-and-one-third years assumed by M. Lamont. The magnetic variations even follow the sun-spots, not only in their regular changes, but also in all their smaller irregularities; and I think that this latter remark will suffice to prove this important relation.

The sixth chapter treats of a comparison between the solar period and the meteorological indications contained in a Zurich register for the years 1000-1800. The result is in accordance with the idea of Sir W. Herschel, that the years in which the spots are more numerous are also drier and more fertile than others; the latter, on the contrary, being moister and stormy. The aurora borealis and earthquakes mentioned in that register predominate strikingly in the years of sun-spots.—*Comptes Rendus*, vol. xxx., pp. 19, 705.

ON THE BITTER PRINCIPLE OF PHYSALIS ALKEKENGI.

BY V. DESSAIGNES AND J. CHAUTARD.

Preparations of this plant have long been used successfully in the treatment of fevers. The active principle resides chiefly in the leaves and fruit capsules, and was prepared by treating the alcoholic extract with water, in which it dissolves, and then shaking the solution with chloroform. When pure it is a white powder, having a bitter taste; it is uncrystallizable, sparingly soluble in cold water, ether, or acids, more soluble in hot water, chloroform, and alcohol. The probable composition is $C_{36} H_{60} O_{30}$.—*Journ. de Pharm. et de Chim.*, 3me ser., t. xxi.

CHEMICAL CONSTITUTION OF JALAP RESIN.

W. Mayer has examined that part of jalap resin which is insoluble in ether. He contradicts the statement of Sandrock, that it consists of two resins, and describes it as being without smell, taste, or colour, softening at 266° and melting at 302° F. This resin Mayer calls rhodeoretine; its composition is $C_{72} H_{66} O_{17}$, and it is identical with the jalapine of Buchner and Herberger, and the β resin of Sandrock. It appears to be the active principle of jalap; three or four grains caused repeated and violent purging. Chemically it does not appear to have the character of an acid, although by the action of bases it is converted into rhodeoretinic acid, $C_{72} H_{64} O_{16}$. Sulphuric acid, hydrochloric acid, and emulsine, convert rhodeoretine into an oily substance —rhodeoretinolic acid—and sugar.

When acted upon by nitric acid rhodeoretinic acid yields oxalic acid, and a white crystalline non-nitrogenous acid—ipomic acid—perhaps identical with sebacic acid. Its composition is $C_{18} H_8 O_8$. Mayer is of opinion that rhodeoretinic acid is a conjugate compound of rhodeoretinolic acid and sugar.

THE DOSE OF LIQUOR POTASSI IODIDI COMP. AND TINCTURE IODINII COMP.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In your January number of the Pharmaceutical Journal, which I have just seen, you give a reply to a question I put you, which shows either that you did not read the letter I sent, or that I did not put that question in a very intelligible way; this latter was no doubt the case. With the view of further explaining the question, I have copied, *verbatim et literatim*, the two preparations of iodine to which I alluded, and on comparing which you will see that, although their medical uses are the same, there exists a great disparity of dose. The iodide of potassium was merely mentioned incidentally as showing the same relative disparity as the iodine, and I thought you might, though I did not, see some reason for the difference in the different solvents used in the two forms.

I am, yours obediently,

R. Clark.

(*From Phillips's Translation of the Pharmacopœia.*)

LIQUOR POTASSII IODIDE COMP.

Take of Iodide of Potassium, 10 grs.
Iodine, 5 grs.
Distilled Water, a pint.
Mix, that they may be dissolved.

Remarks.—In this mixture the iodide of potassium, by uniting with an additional portion of iodine, renders it soluble in water. It has been called ioduretted iodide of potassium. It is a brown-coloured solution, and has the peculiar smell and taste of iodine, and exercises the characteristic reaction of this element on starch.

Medicinal Uses.—This is a mode of exhibiting iodine, which has been found very serviceable in dispersing some forms of bronchocele. Dose: *ƒ℥ss to **ƒ℥ss; but its effects varying in different constitutions, its exhibition requires great judgment.

Dose of Iodine: * 1-64th of a grain; ** 1-8th of a grain.

TINCT. IODINII COMP.

Take of Iodine, an ounce
Iodide of Potassium, two ounces
Rectified Spirit, two pints.
Macerate until they are dissolved, and strain.

Medicinal Uses.—As Liquor Potassii Iodidi Comp. Dose: *♏x. to **ƒ℥j.

Dose of Iodine: * 1-4th of a grain; ** 1½ grain.

Devizes, March 2, 1853.

We can only account for the inconsistency from the circumstance that the last edition of Phillips's Translation was not completed by himself.

OBITUARY.

William Ince.—We announce with much regret the decease of Mr. Ince, of the house of Godfrey and Cooke, in his fifty-ninth year. Mr. Ince has been a Member of the Council from the establishment of the Society; he filled the office of Vice-President in 1849-50, and President in 1850-51. Mr. Ince had been for a considerable time in a delicate state of health, and he died on Saturday, the 26th of March, at his residence in Kensington.

TO CORRESPONDENTS.

R. E. (Ruthin).—Dr. Ure's *Analysis of Soda Water.*—See vol. ii., page 126. We do not recollect any subsequent analysis being published in this Journal.

Chemicus (Worcester).—*Gold Lacquer.*—To one pint of rectified spirit add as much gamboge as will give it a bright yellow colour, then add twelve ounces of seedlac in fine powder, and set it in a sand-bath till dissolved; or a tincture of annatto (one part to eight of spirit) may be added to give the desired colour. Does not require filtering.—Beasley.

K. T. M. (Chester).—*Sumbul.*—See vol. viii., page 546, and vol. ii., page 358.

An Associate (Edinburgh).—Water.

C. W. S. (Wellington).—*Depilatory.*—Mr. Redwood recommends a strong solution of sulphuret of barium, with sufficient powdered starch to form a paste; to be left on for a few minutes, then scraped off with the back of a knife.

B. J. L. (Leeds).—*Dental Physiology and Surgery.*—By John Tomes.

J. R. D. (Huddersfield).—Carbonate of soda in crystals—*not dried.*

Mr. Borland's paper has been received, and is reserved for our next number.

W. Burgess.—The communication has been received, but the specimen has not arrived.

A. P. C. (Witham).—Heat is not a chemical *element*, but an imponderable agent.

W. (Manchester).—See vol. vii. No. 7. Also page 461 of this number, and page 314 of vol. xii. No. 7.

H. W. (Islington).—The power possessed by the Council under the Pharmacy Act of proceeding against persons for illegally assuming or using the title of Pharmaceutical Chemist are not confined to the recovery of one penalty. A person continuing to offend after having been convicted and fined, would be liable to another prosecution, to be repeated *pro re nată*.

W. G. (London).—See No. 7 of this volume, p. 314. When an Associate commences business on his own account he cannot continue to be an Associate.

A Registered Apprentice (Spilsby).—Both the Major and Minor Examinations are less stringent now than they will be after May.

T. J. H. (Gateshead).—See vol. xii. No. 5, page 261. The authority upon which our Correspondent has received his information is not to be depended upon,—the bye-law speaks for itself. All Associates admitted prior to February, 1843, are admissible as Members when they commence business on their own account, on *certificate* and without examination.

W. M. S. (Guildford) is right.

C. J. H. (Witney) should refer to some work on Chemistry or Materia Medica.

Amicus (Sheffield).—The practice of copying every prescription dispensed is not always adopted. Where it is adopted, there is an advantage in copying the prescription before preparing the medicine.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XII.—No. XI.—MAY 1st, 1853.

THE EXAMINATIONS OF THE PHARMACEUTICAL SOCIETY.

In consequence of the announcement that until the month of May the Examinations at Bloomsbury Square would be more lenient than they would be after the passing of the new bye-laws, a large number of Candidates have given notice of their intention to present themselves for examination. The number reported at the last Meeting of the Board was one hundred and fifty-eight.

In consequence of this pressure upon the Examiners the Council found it necessary to make special regulations to meet the urgency of the case, and it was resolved, that the Board should meet twice every month (May excepted) so long as occasion shall require; and that all those who give notice of their intention to present themselves before the first of May shall be entitled to come up for the "Pass Examination" at such time as may be found practicable and mutually convenient. To some Candidates a delay of a month or two may be rather an advantage than otherwise, by affording additional time for study. Others having made arrangements for coming forward on an early day, and being obliged to leave town, are naturally anxious not to be put off. The Board of Examiners desire to consult the convenience of Candidates, so far as may be found practicable; but in the absence of any special circumstances requiring a deviation, they will receive them in the order of their application.

THE SPECIAL GENERAL MEETING AND THE APPROACHING ANNIVERSARY.

During the consideration of the new bye-laws and the arrangements for the Anniversary, a question arose whether the next election of Council and Auditors should be conducted under the Charter and old bye-laws, which remain in force until the next Annual Meeting, or under the Pharmacy Act. The Act declares that, the votes of Members residing more than five miles from the Post-office, St. Martin's-le-Grand, shall be taken "by voting papers authorized by writing in a form to be defined in the bye-laws of the Society, or in a form to the like effect." But the form of voting papers not being defined in the existing bye-laws, it was necessary to pass a bye-law defining the form before such voting papers could be received; and as the Act declares that they shall be received "at all Meetings of the Society at which votes shall be taken for the election of officers," it was decided by the legal advisers of the Society that such must be the case at the ensuing election.

It was on this account that a Special General Meeting was held during the past month for the confirmation of the bye-law, which has subsequently received the confirmation and approval of the Secretary of State, and will come into operation at the Annual Meeting on the 18th of May.

The Special General Meeting to be held on the 11th of May is rendered necessary by the fact, that the old bye-laws will cease to be in force at the Annual Meeting on the 18th. All future bye-laws must be confirmed by a Special General Meeting, and also by the Secretary of State. It is important that the new bye-laws shall be ready to come in force as soon as the old laws expire, since the Society would otherwise be without bye-laws. Supposing the confirmation by the Special General Meeting to take place on the 11th of May,

the confirmation by the Secretary of State will still be required, and a week is as short an interval as could be allowed for this purpose. In fact, it will be fortunate if such confirmation should be obtained in time to be reported to the Annual Meeting. To facilitate this object a copy of the proposed bye-laws was transmitted to the Home Office (with the bye-law relating to the voting papers) about the same time that a copy was forwarded by post to each Member of the Society.

The Transactions of the Society for the present month (page 519) contain the names of the Members of Council who remain in office by rotation, and the candidates proposed for election at the Annual Meeting. The voting papers which will in due course be transmitted to the country Members must be preserved, and forwarded according to the instructions accompanying them, as a second voting paper cannot be issued to any Member, and no voting paper can be received unless transmitted within the time prescribed.

Voting papers are not sent to Members residing within five miles of the Post-office, as these must be delivered personally at the Meeting, and each Member will receive his voting paper at the time of the election. This regulation was adopted advisedly in the Act. It is desirable that those Members who reside within a reasonable distance should attend the Meeting. If their voting papers were allowed to be sent by post many might think it unnecessary to attend, who being obliged, under the existing regulation, to deliver their votes personally, have an additional inducement to be present at the Meeting. These opportunities of meeting together should be taken advantage of whenever they occur. Those who are satisfied with the progress of the Society, and desire to promote its further prosperity, can scarcely think it too great a sacrifice to attend once in the year to give their countenance and support to the proceedings; and on these occasions an opportunity is afforded, on the presentation of the Annual Report of the Council, to make comments on the past management, and offer suggestions for the consideration of the future Council.

The Society having now acquired an important position, and having lately received a very considerable accession of strength and influence, a corresponding amount of responsibility rests on the Members who possess a power never before enjoyed by the Pharmaceutists of this country. In the exercise of this power discretion is requisite. It has been acquired by union among ourselves, and can only be maintained by a continuance of that union and perseverance in the steady and consistent course which has placed the Society in its present position. It should be our desire, from time to time, to rectify any defects which may be found to exist, and to receive with attention such suggestions as may be offered with a view to reform abuses, or in any way to promote the interests of the Society. At the same time we advise the Members not to be misled by vulgar tirades and ridiculous aspersions, emanating from persons professing to be the real friends of the Society, and showing the sincerity of their professions by finding fault with almost everything that it has done from the time of its establishment up to the present day.

PROCEEDINGS UNDER THE MEDICINE STAMP AND LICENCE ACTS.

The officers of the Board of Inland Revenue, Somerset House, have lately been active, especially in the neighbourhood of Bath and Bristol, in the purchase of proprietary medicines, with a view of ascertaining whether the law is observed. We regret to add that many of the parties on whom this patronage has been conferred, have been found wanting, and the Board in Somerset House is in possession of a considerable stock of essence of ginger, Gregory's powder, cough mixture, with other nostrums recommended for various disorders, and sold without stamps. In some instances a paper label, closely resembling a

stamp, is pasted over the cork of the bottle in the manner in which stamps are usually affixed. On a hasty glance it might be supposed that the medicine was duly stamped, but a closer inspection discloses the fact, that the stamp did not emanate from Somerset House, but is an imitation of the genuine article, and intended to denote that the medicine is made only by the vendor whose name it bears.

We have again to request the Members of the Society to revise the explanations of the laws which have appeared in this Journal, and which, if they had not been disregarded, would have prevented the annoyance and expense consequent upon the proceedings now pending. The Acts are, as we have often had occasion to observe, intricate and perplexing; but we have taken much pains in reducing the principle on which they are founded to a simple and tangible form. In this task we have been assisted by legal advisers, and also by the authorities at Somerset House, whose desire is—not to obtain penalties—but to enforce obedience to the law, and who have therefore from time to time afforded every explanation which circumstances have required. Vexatious and oppressive as the law may appear to those whom "the shoe pinches," annoyance may be easily avoided by attention to the rules laid down, and by affixing a stamp in cases where the law requires it. The tax is paid by the public, as the amount of the stamp is added to the price of the medicine; but when the law is infringed, the penalty is paid by the Chemist. In proportion as the provisions of the law are explained and understood, the plea of ignorance loses its effect, and the same grounds for the mitigation or remission of penalties which existed several years ago, do not exist at the present time. We therefore earnestly recommend the Members, in respect for the character of the Society as well as for their own pockets, to comply with the requirements of the Acts so long as they continue in force.

In our number for November, 1851, page 197, we published a brief summary, and also a reference to previous articles on the subject: but we may condense the principle on which the stamp duty is imposed into a small compass, by suggesting the three following questions.

First, Is the medicine a secret or occult preparation?

Secondly, Is it stated to be prepared ONLY by the person whose name it bears?

Thirdly, Is it recommended, on the label, or on a handbill, or by any kind of public advertisement, for the cure or relief of any disorder?

In all or any one of these cases it must be stamped.

More detailed particulars may be found in the articles above referred to, and we may notice in particular, an article under the head "Sailing near the wind," vol. ix., page 298, and the "Instructions to Officers relating to Medicine Stamp Duty, issued by the Commissioners of Stamps," vol. viii., page 154. To the latter article are added the clauses of the Stamp Act under which proceedings are taken, the schedule of medicines specified as liable, and references to other Acts relating to the subject.

A correspondent having inquired whether medicines requiring a stamp in this country are equally liable if exported to the colonies, or elsewhere, we may add that they are liable; and that if sent out without the stamp, they may be seized at the Custom-House, and a penalty inflicted for each bottle, pot, or package.

THE PROPOSED NEW TARIFF.

We subjoin an extract from the new Tariff, containing a list of the goods wares, and merchandize connected directly or indirectly with the drug trade which will be subjected to change or repeal of duty if the proposal of the Chancellor of the Exchequer should be carried. Most of the changes are of little importance, and for what purpose they are introduced it is not easy to conjecture. It cannot be with a view of carrying out the principles of free trade,

as the changes are partial, and, in some instances, inconsistent with such principles.

For example: the duty on morphia and its salts is reduced from 5*s.* to 2*s.* 6*d.* per lb., while the duty on opium remains the same, and the duty on spirit is not diminished. Thus the *foreign* manufacturer is *protected* by an import duty on the raw material* and an excise duty on the spirit required in this and other chemical processes. The English manufacturer is to be deprived of half the protection he formerly enjoyed, as a set-off against this disadvantage, in the form of an import duty on the preparations. If we are to have free trade on one side it is only fair that we should have it on the other, or if any protection is to be retained *charity begins at home*, and the British manufacturer has a prior claim on the British legislature, and the repeal of the duty on opium would be an act of policy as well as justice. Foreign governments protect the interest of their own subjects, which is held by them to be the primary consideration. It will be seen that the preparations of mercury are to be free of import duty, we may, therefore, expect an influx of foreign blue pill and other mercurials

In the case of drugs and medicinal substances this is not merely a money question. We have on previous occasions adverted to the fact that import duties on these commodities act, to some extent, as a check upon the sale of such as are damaged and worthless. The reduction of such duties is not felt by the public, it confers no benefit on the trade, it entails loss on the holders of stock, and reduces the amount of revenue from that source without diminishing the expenses of collecting, or producing any advantage to counterbalance the inconvenience attending the change.

Much dissatisfaction exists on the subject of the excise licence for the sale of tea, coffee, chocolate, and pepper. According to the proposed arrangement, the Chemist who is obliged to sell pepper will on this account be under the necessity of taking out the above licence, amounting to a per centage on the rental, namely, 11*s.* 6*d.* if the rental do not exceed £10, and a further sum of one shilling in the pound on any amount of rent exceeding £10. As pepper is a drug, and of necessity included in the stock of a Chemist, this becomes a serious question, and we trust some steps will be taken to effect a fair arrangement on the subject.

We have no doubt that upon a proper representation of the facts, the Chancellor of the Exchequer would be willing to introduce such amendments as to meet the justice of the case, and an opportunity will be afforded for a full consideration of the subject, by the Members of the Society, before the House goes into committee on the details of the proposed changes.

CUSTOMS.

No. 1.

That the duties of customs chargeable upon the goods, wares, and merchandize, hereafter mentioned, imported into the United Kingdom, shall cease and determine, viz:—

Amber, manufactures of; anchovies, aquafortis; barytes, sulphate of (ground); blacking; brass, powder of; bronze powder, paint; camphor, refined, cantharides, carmine; chalk, prepared or manufactured, and not otherwise enumerated; chicory, or any other vegetable substance, applicable to the uses of chicory or coffee, viz., raw or kiln-dried; cobalt, oxide of; twine, copper, ore of, &c.; crystal, cut or manufactured; elder-flower water, extract of chestnut-bark and wood, quercitron bark, logwood, safflower, gunpowder, honey; ink, Indian, isinglass; lead, pig and sheet; liquorice root; mercury, prepared, naphtha, oil of rosin, olives, orange-flower water; painters' colours, manufactured, phosphorus, rose-water, saccharum saturni; spelter, or zinc, viz., rods and oxide of, tamarinds; tin, viz., in blocks, ingots, bars, or slabs; turpentine, of a greater value than 15*s.* per cwt., oil or spirit of vaneliose, varnish not otherwise described, verdigris, verjuice, vinegar; wax, sealing.

* The duty on opium paid by the foreign manufacturer is 4*d.*; in this country it is 6*d.* 8*d.* or more, according to quality; the price of spirit of wine in England is raised by the duty more than 100 per cent. above that in France and Germany.

No. 4.

That in lieu of the duties of customs now chargeable on the articles undermentioned, imported into the United Kingdom, the following duties shall be charged, viz:

		£	s.	d.
Almonds, Jordan	the cwt.	0	10	0
" not Jordan nor bitter	"	0	10	0
" paste of	the lb.	0	0	2
Arrowroot	the cwt.	0	0	4½
Barley, pearled	"	0	0	4½
Brass, manufactures of, not otherwise enumerated		0	10	0
Bronze, manufactures of, not otherwise enumerated		0	10	0
Candles, viz., Spermaceti	the cwt.	0	2	4
Stearine	"	0	2	4
Tallow	"	0	2	4
Wax	"	0	2	4
Capers, including the pickle	the lb.	0	0	1½
Cassava Powder	the cwt.	0	0	4½
Cassia Lignea	the lb.	0	0	1
Chicory, or other vegetable matter applicable to the uses of chicory or coffee, viz.—				
Roasted or ground	the lb.	0	0	6
Cinnamon	"	0	0	2
Cloves	"	0	0	2
Coculus Indicus	the cwt.	0	5	0
Confits, dry	the lb.	0	0	1½
Confectionary	"	0	0	1½
Corks, ready made	"	0	0	3
Squared for rounding	the cwt.	0	4	8
Essences, viz.—				
Of Spruce	the lb.	0	2	6
Not otherwise enumerated or described, viz., extract of cardamoms, Coculus Indicus, Guinea grains and of Paradise, liquorice, nux vomica, quassia, opium, Guinea pepper, vitriol, Peruvian or Jesuit's bark, and of radix Rhatanise...	or at the option of the Importer for every £100 value	10	0	0
Extract or preparation of any article, not being particularly enumerated or described, nor otherwise charged with duty				
Jewels, emeralds, and all other precious stones, set	for every £100 value	10	0	0
Lead, manufactures of, not otherwise enumerated	the cwt.	0	2	0
Liquorice paste, not of the British Possessions		1	0	0
Macaroni		0	1	0
Mace	the lb.	0	1	0
Morphia and its salts	"	0	2	6
Mustard flour	the cwt.	0	1	6
Nutmegs of all sorts	the lb.	0	1	0
Nux vomica	the cwt.	0	2	0
Oil, viz., Almond	the lb.	0	0	1
Bays	"	0	0	1
Perfumery, not otherwise enumerated	per lb.	0	0	2
Pickles, preserved in vinegar	the gal.	0	0	1
Pimento	the cwt.	0	5	0
Pomatum	the lb.	0	0	2
Powder, viz., Hair-powder	"	0	0	2
Perfumed	"	0	0	2
Not otherwise enumerated or described, that will serve the same purpose as starch	the cwt.	0	0	4½
Quassia	"	0	1	0
Sago	"	0	0	4½
Semolina	"	0	0	4½
Starch	"	0	0	4½
Tapioca	"	0	0	4½
Tinfoil	"	0	10	0
Manufactures of, not otherwise enumerated	the cwt.	0	10	0
Spirits, cordials, or strong waters, not being the produce of any British Possession in America, nor of any British Possession within the limits of the East India Company's charter, in regard to which the conditions of the Act 4th Vict., chap. 8, have or shall have been fulfilled, sweetened, or mixed with any article, so that the degree of strength cannot be exactly ascertained by Sykes' hydrometer; and perfumed spirits to be used as perfumery only	the gallon	1	0	0
Vermicelli	the cwt.	0	1	0
Washing-balls	"	0	16	0
Water, Cologne-water, the flask (thirty of such flasks containing not more than one gallon)	each	0	0	8
When not in flasks (as perfumed spirits)	the gallon	1	0	0

No. 5.

That the duties of customs now chargeable on the articles undermentioned, imported into Scotland and Ireland, shall cease and determine, and in lieu thereof the following duties shall be charged, viz.:

		£	s.	d.
Spirits or strong waters, for every gallon of such spirits, of any strength not exceeding the strength of proof by Sykes' hydrometer, and so in proportion for any greater or less quantity than a gallon, viz.:				
Spirits or strong waters, the produce of any British Possession in America, not being sweetened spirits or spirits mixed with any article so that the degree of strength thereof cannot be exactly ascertained by such hydrometer:				
If imported into Scotland	the gall.	0	3	0
" " Ireland	"	0	5	8

No. 6.

That in lieu of the present *ad valorem* rates of duties of customs charged upon the importation into the United Kingdom of the undermentioned articles, as not being enumerated in the Tariff, the following duties of customs shall be charged thereon, viz.:

		£	s.	d.
Caoutchouc or India-rubber, manufactures of	the lb.	0	0	4
Gutta percha, manufactures of, not moulded, such as bands, sheets, soles, tubing	the cwt.	0	5	0
Articles moulded	the lb.	0	0	2
Lucifers, of wood, in boxes containing not more than 100 matches,	the gross of boxes	0	0	2
In boxes containing more than 100	the gross of boxes	0	0	5
Vesta of Wax, in boxes not exceeding 1,000 matches	the 1,000 matches	0	0	0½
Manna crump	the cwt.	0	0	4½
Salicine	the oz.	0	0	3
Sauces not otherwise enumerated	the lb.	0	0	1
Soy	the gallon	0	0	6
Stearine	the cwt.	0	1	6

FURTHER OBSERVATIONS ON THE PROPOSED MEDICAL BILL.

In our number for January, we gave a brief notice of the draft of a Medical Bill, which had been announced as being on its way to the House of Commons. Since that time a deputation, consisting of the leading supporters of that measure, with several Members of Parliament, has had an interview with the Home Secretary, with a view, we are informed, of inducing the Government to take charge of the Bill.

We have seen no published report of what took place on the above occasion, but understand that the conversation related to general principles rather than details, and that the draft submitted to Lord Palmerston was substantially the same which had been published, and which originated with the Provincial Medical and Surgical Association, of which Sir Charles Hastings is President.

Judging from the tenor of the current conversation on the subject, we may infer that the Bill is likely to meet with a more favourable reception than its predecessors; but whether the apparent assent arises from apathy and want of faith in the passing of any Medical Bill, or whether it proceeds from a positive approval, we are at present unable to determine. There are many members of the profession who have dismissed the question of medical reform from their minds as chimerical; but others, who previously entertained this idea, have expressed more sanguine expectations with reference to the Bill now in contemplation.

We must therefore deal with it as a measure likely to be shortly introduced into Parliament, and consider that portion of its provisions which relates to Pharmacy, and which, as we have before stated, would, if passed in its present form, affect the interest of Pharmaceutical Chemists.

During the discussion on the Pharmacy Bill in the House of Commons, a certain principle was laid down, which was also insisted on by the witnesses, and assented to by the members of the Select Committee. This principle is adopted, and concisely expressed in the preamble of the Bill now before us.

"Whereas it is for the good of all Her Majesty's subjects that the knowledge of physic and surgery should be promoted, and that means should be afforded whereby those who have been examined and found skilful by competent authority may be known from ignorant and unskilful pretenders to the same knowledge: and whereas the laws now in force concerning the profession of physic and surgery require to be amended, be it enacted," &c.

From the terms of this preamble, it might be inferred that the Bill was intended merely to provide for the registration of qualified practitioners, and the protection of the public against imposition. This is the principle of the Pharmacy Act, which was curtailed and modified, because as originally drawn, it went a step further, and prohibited the dispensing of prescriptions by incompetent persons.

But while the principle of the Pharmacy Act is adopted in the preamble of the proposed Medical Bill, the provisions of the Bill are drawn in accordance with the principle of former medical bills, which prohibit under a penalty, the practice of medicine by unqualified persons. This deviation from what appears on the face of the preamble, may probably be explained by reference to the concluding sentence, which alludes to the laws now in force requiring to be amended.

It is not our purpose at the present time to discuss the comparative merits of the two modes of legislation, but the distinction may be thus explained:—According to the principle of previous medical legislation, the penalty is recoverable for the performance of certain functions by an unqualified person, but not for the assumption of a sign or title, or pretending to be qualified. According to the principle of the Pharmacy Act, the penalty is recoverable from an unqualified person for deceiving the public by pretending to be qualified, but not for performing the functions, provided he does so without such pretence.

In the former case, the public are liable to imposition, and the impostors usually escape punishment, because the persons imposed upon are the only witnesses who could bring them to justice. In the latter case the responsibility is thrown upon the public, who are enabled to distinguish between the qualified

and the unqualified; and the conviction of an offender is made easy because the assumption of a title or sign implying qualification could at once be proved, and without such assumption, he might "live to blush unseen, and waste his sweetness on the desert air."

In the Bill before us, the former principle is professed in the preamble, the latter carried out in the provisions.

"Clause xxvi. *Summary penalty against unregistered practitioners.*—If any person shall, after the first day of February, 1854, act or practise as a Physician, Surgeon, Apothecary, or Licentiate in medicine, in any part of the United Kingdom, without being duly registered according to the provisions of this Act, and without having a certificate as aforesaid in force at the time of his so practising or acting as a Physician, Surgeon, Apothecary, or Licentiate in medicine, he shall, on conviction before any magistrate having jurisdiction in the county, city, or place where the offence was committed, forfeit and pay a sum not exceeding five pounds nor less than forty shillings, for every such offence, to be recoverable within six months next after the commission of the said offence."

In the interpretation clause, the term "Medicine" is defined to signify "Medicine, Surgery, Midwifery, and Pharmacy," consequently, a "Licentiate in Medicine" would signify a person licensed to act or practise in these several capacities, and a person acting or practising in any one of them, would be acting or practising as a licentiate in medicine, and liable to the penalty if unregistered. This clause therefore would annihilate Chemists and Druggists, if it were not guarded by the following:—

"Not any thing in this Act contained shall extend or be construed to extend to prejudice or in any way to affect the trade or business of a Chemist or Druggist in the buying, preparing, compounding, dispensing and vending drugs, medicines, and medicinable compounds, wholesale or retail, without the giving of medical or surgical advice."

This *qualified* exemption, coupled with the definition of the term "medical," places the Chemist and Druggist in an equivocal position. If he should advise a patient to take a dose of medicine, recommend one preparation in preference to another, or suggest the application of a plaster to a cut, he has not fulfilled the conditions on which he is exempted from the operation of the Act. A variety of questions might arise on this point, and he would never be secure against persecution. Although expressed in different words, this restriction is substantially the same which has been usually introduced into previous Medical Bills, and which has given rise to more discussion than any other problem relating to medical reform. We are not advocating the practice of medicine by Chemists, but we advocate consistency, and claim on behalf of Chemists with regard to giving advice, that which is conceded to unqualified shopkeepers with regard to the sale and dispensing of medicines. The supporters of the restrictive policy in the former case, adopt the opposite principle in the latter, but we maintain that the same principle, *mutatis mutandis*, is applicable to both. The question is this—are persons to be prohibited from performing that for which they are not qualified, or are they merely to be prohibited from fraudulently assuming titles and signs implying qualification? Nearly all the medical witnesses before the Select Committee on the Pharmacy Bill appeared in the capacity of absolute free traders. They would admit of no restriction on the uneducated shopkeeper in the sale of medicines, or even in the dispensing of prescriptions. No protection was to be granted to the qualified Pharmaceutical Chemist, except in the distinction of a sign or title enabling the public to discriminate between the educated and the ignorant. A tinker might dispense Physicians' prescriptions, but could not assume the title of Pharmaceutical Chemist. The principle was adopted by the legislature, and we have at present seen no reason to be dissatisfied with the result. The same dose which the medical reformers have administered to the Chemists they must swallow themselves, and they must alter their Bill accordingly, otherwise it will share the fate of its predecessors.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A SPECIAL GENERAL MEETING OF THE SOCIETY,

Held on the 6th of April, 1853.

MR. JOSEPH GIFFORD, PRESIDENT, IN THE CHAIR.

The forms of Voting Papers agreed to by the Council were submitted. (See the *Transactions* of last month, page 464.)

Moved by MR. HALLOWS, seconded by MR. SQUIRE.—*Resolved*,

That the Form of Voting Paper, relating to the election of Members of Council, be adopted, the words "on the Scrutineers" being omitted, the words "and address" being added after the words "his name," the "Nota Bene" also being omitted and placed on the envelope sent to Country Members only.

(See page 465.)

Moved by MR. J. B. EDWARDS, seconded by MR. BASTICK.—*Resolved*,

That the Form for voting at the election for Auditors be adopted, substituting for the first instruction the following words:—"Every Member voting must erase the names of all the Candidates for whom he does not intend to vote. If more than five names be left, the voting paper will be rejected."

The following are the instructions for voting as finally agreed upon by the meeting and subsequently confirmed by the Secretary of State:

FOR MEMBERS OF COUNCIL.

INSTRUCTIONS FOR VOTING.

"Every Member voting must erase the names of all the Candidates for whom he does not intend to vote. If more than fourteen names be left the voting paper will be rejected.

"The voting paper, after the erasure of names, must be folded up and enclosed in the accompanying envelope, addressed to the Secretary.

"To prevent imposition, the Member must sign his name and address on the lines on the outside of the envelope."

FOR AUDITORS.

INSTRUCTIONS FOR VOTING.

"Every Member voting must erase the names of all the Candidates for whom he does not intend to vote. If more than five names be left, the voting paper will be rejected.'

"This paper is not to be signed, but is to be folded up and enclosed in the envelope to the Secretary by the post."

PHARMACEUTICAL MEETING,

Wednesday, April 13th, 1853.

MR. JACOB BELL IN THE CHAIR.

THE following DONATIONS were announced:—

The Literary Gazette, four numbers, from the Publishers.
The Journal of the Society of Arts, four numbers, from the Society.
The Journal of the Photographic Society, from the Society.
The Life of the late William Allen, in three volumes, and the Abridgement of the same, from Mr. Thomas Herring.

Petrified Oak, found at Dowle's Brook, near Bewdley, Worcestershire, from Mr. Buckley.

Kokarima Cardamoms, from Mr. Daniel Hanbury.

A Specimen of Leaves from Port Beaufort, Southern Africa, used by the natives as a stomachic and anthelmintic.

Several SPECIMENS OF BARKS OF CINCHONA and some allied genera, together with the active principles obtained from them, were presented by Mr. JOHN E. HOWARD, with the following description (drawings of the microscopic appearances of sections of some of the barks were also on the table).

According to promise, I send some specimens which may be interesting to the Pharmaceutical Society. I would, in the first place, direct attention to the coloured drawings under the microscope executed by Mr. Tuffen West.

The first of these, No. 1, shows the transverse section of the bark called China bicolorata by the Italians, or Quinquina bicolore by the French. The origin of this bark is described by M. Guibourt (*H. Drogues*, 4me Ed., tome iii. p. 176) as *probably* from the *Stenostomum acutatum* D. C. Of this bark I send a sample (belonging to a large recent importation), as also of the bitter principle which it contains.

No. 2 is a transverse section of the bark which is named by M. Guibourt *Quinquina nova colorada*, and described in the *Hist. Drogues*, tome iii. p. 165. This particular sample came from Para, and is consequently identical with the *Q. de Brezil*, which has been attributed to the Buena hexandra. The drawing exhibits the cells as filled with the red colouring matter which is so characteristic of this kind.

No. 3 is a transverse section of the bark of the variety γ erythroderma of the Cinchona ovata. This bark contains a considerable quantity of quinine, as well as a little cinchonine, and the structure shows the same appearance of the arrangement of the bark fibres as in the magnified section of C. ovata, given by Weddell. The lower part of the drawing shows the *derm* with the cells filled with red colouring matter, whence the name *erythro-derma*.

No. 4 is a section of the Paraguatan bark of Guibourt (tome iii. p. 167), the Condaminea tinctoria of De Candolle. Of this I send a small specimen, but the quantity I have obtained is not sufficient to allow me to state its contents. I send in addition to these a specimen of the genuine "*arica bark*," the produce of C. Pelletierana, with the product *aricine*, a *feeble base*, differing wholly from quinine, quinidine, and cinchonine. It is very soluble in ether, and crystallized (first specimen) from that medium. The second specimen is the sulphate, showing the peculiar gelatinous tendency which has been noticed. This, however, breaks up after a time into a more crystalline appearance.

ON THE SUBSTITUTION OF THE CARBONATE FOR THE OXIDE OF SILVER IN COMMERCE.

BY MR. JOHN BORLAND.

AT the present time, when attention is so properly directed to the detection and exposure of adulterations and impurities in many substances used in dietetics and medicine, I beg to be allowed to draw attention to the existence of a fraud which appears to me to be very generally practised with a medicine that is now come into extensive use as a tonic in dyspepsia and other complaints of the digestive organs. I allude to the substitution of carbonate of silver for oxide of silver.

I have carefully examined several specimens, all purchased from different respectable wholesale druggists in London, and have found that each of them, besides being contaminated with the oxides of copper, lead, and iron, contained a large proportion of carbonic acid, and effervesced strongly when thrown into diluted nitric acid.

As none of the specimens was wholly soluble in liquor of ammonia, but contained a considerable quantity of some substance insoluble in this menstruum, I was led to suppose that the evolution of the carbonic acid might be due to the presence of some earthy or alkaline carbonate that had been added by way of adulteration. This, however, after close examination, I found not to be the

case, so that the effervescence could not be accounted for in any other way than by supposing the carbonic acid to be combined with the oxide of silver.

That it was carbonic acid I satisfied myself by holding a watch-glass moistened with lime water above the effervescing solution, when a thin whitish film of carbonate of lime was visibly and quickly formed. I also passed the acid into a solution of pure caustic potass, and on afterwards testing the solution found it to contain *carbonate* of potass.

In the preparation of this sophisticated article, the manufacturer, I suspect, has employed a solution of the carbonate of some one of the fixed alkalies in place of its caustic solution, to precipitate the oxide of silver.

The product yielded by this process is consequently greater, as it contains the additional weight of the carbonic acid with which it is combined,—a sum which is easily calculated if we consider how much the equivalent weight of the carbonate of silver, which is 138, exceeds that of the oxide, which is 116.

The manufacturer who disposes of this at the price of the pure oxide is thus enabled to realize, besides the legitimate profit due to him as maker of the article, an *additional profit* of a sum equal to the commercial value of about 2¼ozs. of oxide of silver on every 16 ozs. that he sells.

This pecuniary view of the subject should, however, be only of very secondary importance to the dispensing Chemist, whose duty it is *not* to pry into the profits of the manufacturer, but above all to endeavour to serve his customers with a genuine article, and faithfully to carry out the intentions and wishes of the physician who may prescribe for them. Neither of these objects are effected by the dispensing of this or any other adulterated medicine.

In illustration of the difference between the two substances, I shall suppose that a patient receives from his physician a prescription for one dozen of pills, each of which is to contain one grain of oxide of silver. The prescription is with all confidence placed in the hands of the Chemist, to be carefully and properly made up, and the Chemist, either through the cupidity and dishonesty of himself or the manufacturer, or it may be through his own ignorance of, and inattention to the quality of the article supplied to him, in this case by using the carbonate, makes up the pills with only ten grains of oxide of silver in place of twelve grains.

This difference it may be said, is not great, but whether it be trifling and insignificant or not, it is no extenuation or palliation of the culpability attending the substitution of one medicine for another.

The Chemist who is coolly indifferent as to whether or not he sells a genuine or an adulterated article, will, with equal levity of feeling, be careless whether the impure medicine be one that is potent in its effects, or one that is capable of producing little or no appreciable influence on the living organism.

The process of qualitative analysis which I pursued for detecting the presence of the oxides of copper, lead, and iron, has nothing of novelty in it, and therefore need not be described. I may, however, remark that from several experiments which I made, I have reason to think that the carbonate of silver contains a small quantity of water, it may be from not having been properly dried after being washed, or from its being combined with it constitutionally as a *hydrate*.

This additional impurity, together with those already referred to, make the difference between the oxide and carbonate greater than it really appears to be from a mere comparison of their respective equivalent weights.

Princes Street, Kilmarnock, March 22, 1853.

Dr. Hunter Lane wished to observe, with reference to the communication before the Meeting, that the occurrence of such cases as that alluded to, could not fail to raise in the minds of physicians a feeling of mistrust of the accuracy with which their prescriptions are dispensed, when taken to Chemists who are

unknown to them; and this, he believed, was the principal cause of the practice, which the physician was sometimes driven to, of recommending a Chemist in whom he could place confidence. Instances had frequently come under his notice, in which substitutions of a more serious character than that mentioned in the paper, had been practised by dispensers of medicines, and he trusted, as indeed he believed, that the Pharmaceutical Society would exert a beneficial influence in inducing among Pharmaceutical Chemists a more faithful discharge of their duties, from which would result a better understanding and mutual confidence between them and the members of the medical profession.

Mr. Waugh, whilst he was ready to admit that there might be some grounds for the observations which had been made, thought that physicians ought to be very careful how they passed judgment on Chemists in any particular cases, for he had reason to believe that injustice was sometimes done in this way. He mentioned a case which came under his own immediate observation, in which a physician had condemned a quantity of sulphate of quinine as impure, because it was not soluble in a small quantity of sherry wine, and had recommended the customer to return it, and to go to another Chemist in whom he said he could feel confidence. This physician was subsequently convinced that it was not the medicine but his chemistry that was at fault; but such an occurrence might cause serious and unmerited injury to the Chemist, especially if he was a young man, or recently established.

Mr. Allchin thought, with reference to the case alluded to in the paper, that the presence of carbonic acid was probably accidental rather than intentional, having been caused by the use, in its preparation, of a caustic alkali, not wholly free from carbonic acid. The statement would have been more satisfactory if a quantitative analysis had been made.

Mr. Redwood agreed with Mr. Allchin, that the carbonic acid should have been quantitatively determined. As, however, the author of the paper had sent two specimens of the "oxide of silver" alluded to, he had just examined them with an acid, and found the effervescence to be much greater than could be accounted for in the way mentioned by Mr. Allchin. He was aware that oxide of silver was sometimes sold at a price below that at which it could be made if pure.

Mr. T. B. Groves said he had recently seen some pills composed of oxide of silver and extract of hop, which, after having been kept for some time, had swelled up and become very spongy, as if some gas had been disengaged. He was unable at the time to account for this result, but he now thought it most probable that oxide of silver, such as that described in the paper, had been used; and that reduction of the oxide having taken place, the carbonic acid had been liberated.

Mr. Lofts had known pills containing one grain each of oxide of silver to produce salivation, from which he inferred that oxide of silver was sometimes adulterated with oxide of mercury.

Mr. Morson said, that a case of that kind had occurred some time ago at one of the hospitals, when it was found that black oxide of mercury had been sold for oxide of silver.

NOTICE OF A NATIVE CARBONATE OF SODA FOUND IN THE TERRITORY OF THE NIZAM, INDIA.

BY W. H. BRADLEY, ESQ.,
Surgeon in His Highness the Nizam's Service.
(COMMUNICATED BY MR. H. DEANE.)

The salt in question is found at the Loonar Lake, which is situated in about 20° N. lat. and 77° E. long. There can be no doubt whatever, that the lake is an ancient volcano, long ago burnt out; and I have fancied that from this vent have streamed the peculiar trachytic rocks to be traced east and west for 100 miles, but this is purely conjecture.

It is placed just within the borders (south-east) of the Great Trap formation of Central India, is cup-shaped, the edge well-defined and continuous, being nearly five miles in circumference, with a depth averaging 500 feet, sloping at a great angle. The outer edge of the crater is flush with the surrounding country on the east and south-east side, and banked on the north, south, and west. The rocks are observed to be disposed in a stratiform manner, the result of successive pourings forth of the molten matter, and of subsequent upheavals. The point of exit for the boiling lava was evidently at the north-east angle.

Some have imagined the hollow to have resulted from a subsidence of the crust of the earth, but such is not the case. I found decided proofs of its once volcanic energies in a hill covered with scoriæ, close upon the southern side. Besides, were it a case of subsidence, the dip of the stratiform masses of rock would indicate it, which they do not, being all in the usual direction of these Trap Rocks, dipping away slightly to the north-east.

The hollow is not completely filled with water, only about one-third of its surface being so occupied. A belt of palm trees (*Borassus flabelliformis*) surrounds the margin of the lake, and beyond them is a thick jungle of forest-trees and creepers of vigorous growth. The water of the lake is intensely bitter, is green in colour, and contains neither fish nor other instances of animal life. To leeward a very strong odour of sulphuretted hydrogen is perceptible, more so at some times than others. The water varies in depth over the lake, the deepest part being towards the west, where it is as much as twenty feet; but this depends entirely on the monsoon, as a stream from the hill side falls into the lake, which is thus influenced by the rains.

The saline spring is in the centre of the hollow, and although, in dry seasons the crater is nearly free from water, there is always a puddle around this spring. The deposit of salt is found in layers under the mud, being the richest immediately around the spring. It can only be procured when the water in the lake is low, a circumstance that has not occurred for the last few years.

The natives collect it and store it up in heaps by the side of the lake, with only a thatching of palm leaves to protect it from the weather. It is used in making country soap, glass bangles, and for washing silk.

Although the lake itself is brackish, and strongly saturated with saline matter, still springs of fresh water flow close to its margin; but a little consideration shows that there is nothing astonishing in this circumstance, although, at first, it appears so to visitors. The fresh water, after percolating through the hills, finds vent here, whilst the saline spring rises from the bowels of the earth.

The vegetation of the spot consists principally of Tamarindus, Bauhinia, Conocarpus, Flacourtia, Grewia, Combretia, &c. Upon the sides of the crater are Boswellia, Sterculia, Bombax, Dalbergia, Clematis, &c. Great numbers of wild fowl resort here, but it cannot be a feeding place for them. Green pigeons, orioles, peacocks, monkeys, and hares, abound in the belt of jungle, with animals of less quiet behaviour, for I frequently saw the foot-prints of panthers in the sandy soil; and a gallant colonel, some few years ago, had a narrow escape with his life at this place, being severely injured by a tiger.

I could not approach the site of the spring to ascertain what the temperature of it might be—probably it is high. There are hot springs, some forty or sixty miles off, on the east, with a temperature of 120°, where the secondary overlying Trap meets with gneiss and granite.

Aurungabad, January 25, 1853.

A specimen of the salt was laid on the table, with a report of its chemical examination, by Mr. R. Reynolds.

CHEMICAL EXAMINATION OF SPECIMEN OF NATIVE CARBONATE OF SODA, SENT BY W. H. BRADLEY, ESQ.

BY MR. R. REYNOLDS,

The specimen was capable of division into two parts, which were in about equal quantities.

1st. Hard and irregular masses like horn, and having abundant evidence of crystallization when fractured.

2nd. White amorphous strata (effloresced salt) and smaller pieces, with more dirt adhering.

An analysis of the first described portions gave

Soda 32.8	}	67. anhydrous sesquicarbonate.
Carbonic acid 34.2	}	
Water .....31.		
Chloride sodium ..... 2.		
Alumia trace		
100.		

The above proportions of soda and carbonic acid are just those constituting a true sesquicarbonate, or rather that salt contains theoretically,

Soda, 32.8 Carbonic acid, 34.8

whilst the analysis of this specimen, which was verified by repetition, gave

Soda, 32.8 Carbonic acid, 34.2

The second portions, into which the sample was divided, contained about twelve per cent. of insoluble matter, but from the effloresced condition of a part of the carbonate of soda, its richness in alkali was scarcely less than the first.

THE PHOSPHORUS DISEASE.

Mr. Jacob Bell directed the attention of the meeting to a portion of diseased bone, transmitted to him towards the end of January last, by Mr. Standring, of Manchester, who had received it from Mr. Evans Thomas, the medical attendant of the patient. It consisted of the remains of the lower jaw (a portion having been used for chemical analysis), and was a good illustration of the formidable disease prevalent among lucifer match-makers. Mr. Bell stated, that when in Manchester last year, he had seen several cases of this disease; some in more or less advanced stages, and others after a cure had been effected by the sacrifice of the diseased bone. Having expressed a desire to obtain a specimen of the bone for examination, he was indebted to Mr. Thomas for the one now before the meeting, which had been chemically examined by Mr. Redwood. Although this examination had not thrown any light upon the cause of the disease or the *modus operandi* of the poison, the result, negative as it was, might possibly have the effect of directing attention to the subject, and leading to further investigation. The question which had been raised, and which he had desired to see cleared up, was whether the disease was caused by the chemical action of the fumes of the phosphorus on the bone, and an alteration of the chemical constitution of its inorganic constituents, or whether the phosphorus merely acted as an irritant, causing inflammation and the consequent sloughing of the part affected. Mr. Redwood's results seemed to indicate that the diseased bone did not differ in chemical constitution from bone in a state of health. This, however, did not furnish a conclusive answer to the question at issue, as the bone had become spongy by the destruction of some portion of its substance, and although the portion which remained appeared to be chemically unaltered, no evidence existed as to the chemical state of the portion which had disappeared from its interstices, leaving the specimen in its present spongy condition. The patient, Bridget Wilson

(who is now living), lost both her parents when very young, and at the age of about eight years, was employed by her aunt at a hand-spinning machine, at which she was required to stand upright during the whole of the day. She continued at this employment for several years, during which time her health did not suffer, but her knee-joints became deformed, being affected with what is termed "knock-knees," the result of standing for so many hours at that early age. Her constitution is naturally healthy, and exhibits no symptoms of a strumous habit. She had been employed at the match-factory about two years before she was conscious of any bad effects from the fumes of the phosphorus. The disorder at first resembled ordinary toothache, attended, however, with swelling of the face. As the severity of the symptoms increased, she applied at the Royal Infirmary at Manchester, where she was admitted as an in-patient, July 2nd, 1852. She derived but little benefit from the treatment, and afterwards became an out-patient. December 27, 1852.—All the teeth on the right side of the lower jaw fell out, or were removed without any difficulty, before the jaw was removed, and on the left side as far as the second bicuspid, all the teeth were sound. There is a great deal of new callus thrown out in the situation of the old bone, so much so, that there will be scarcely any disfigurement from the loss of the jaw—a little from the loss of teeth. She can close her jaw and chew her meat and bread well. The bone and teeth of the upper jaw are in a perfectly healthy state, and she now enjoys excellent health. The notes, of which the above is an extract, were made about the end of last year. The bone which remains after a sufficient portion had been taken for analysis, is preserved for the Museum of the Pharmaceutical Society.

Mr. Redwood stated that he had determined the proportions of inorganic and organic constituents of the diseased bone, which were as follows;—

Phosphate of lime and magnesia	46.2
Carbonate of lime	9.8
Organic matter	44.0
	100.0

These proportions agreed pretty nearly with those frequently found in healthy bones. The phosphate of lime of the diseased bone was also the same as that of healthy bone, being infusible in the blow-pipe flame, and yielding, when decomposed, a yellow precipitate with nitrate of silver. He had been unable to detect any free phosphoric acid in the diseased part.

PURIFICATION OF TALLOW AND GREASE.

Mr. Wiggin, of Ipswich, explained to the Meeting a process which he has recently patented, for melting and purifying tallow and other kinds of grease. The process consisted in heating the fatty substance in the state in which it is removed from the animal, with a small quantity of sulphuric acid of sp. gr. 1.3 to 1.45. The acid dissolves the membrane and other impurities present, acquiring a dark colour and thick syrupy consistence, while the fat separates in a great state of purity. Some samples, which were shown to the Meeting, of tallow and also of lard which had been prepared by this process, were whiter and more free from flavour than those prepared in the usual way.

In the discussion which ensued, it was suggested that the fats obtained by this process were probably the fatty acids resulting from the decomposition of the neutral fats by the oil of vitriol; but Mr. Wiggin stated, that in using the sulphuric acid at the density indicated no decomposition of the fats was effected, and that no sulphurous acid was evolved in the process.

NOTICES.

SPECIAL GENERAL MEETING.

A Special General Meeting will be held at the House of the Society, on Wednesday, the 11th day of May, at 11 o'clock in the Forenoon, precisely, for the purpose of approving the new Bye Laws, recently transmitted to the Members.

CONVERSAZIONE.

A Conversazione will be given at the House of the Society, on Tuesday, the 17th of May, at Eight o'clock in the Evening, to which Members and their Friends, and the Associates of the Society, are invited.

ANNUAL GENERAL MEETING.

The Twelfth Annual General Meeting of the Members will be held at the House of the Society, on Wednesday, the 18th day of May next, at 11 o'clock in the Forenoon for 12 precisely, to receive the Report of the Council, and to elect the Council and Auditors for the ensuing year.

The following continue Members of the Council, by lot, agreeably with the provisions of the Charter:

Bell, Jacob, 338, Oxford Street.
Bird, William L., 42, Castle Street, Oxford Street.
Davenport, John T., 33, Great Russell Street, Bloomsbury.
Garden, Felix R., 372, Oxford Street.
Herring, Thomas, 40, Aldersgate Street.
Hooper William, 24, Great Russell Street, Covent Garden.
Macfarlane, John F., 17, North Bridge, *Edinburgh*.

The following is the list of Candidates who have consented to be proposed as Members of the Council for the next year:

1. Bastick, William, 2, Brook Street.
2. Best, John Dear, *Leytonstone*.
3.*Buckler, William H., 86, New Bond Street.
4.*Deane, Henry, *Clapham*.
5.*Dickinson, William, 16, Cambridge Street, Hyde Park
6.*Edwards, George, Spital Street, *Dartford*.
7.*Edwards, John B., 42, Berry Street, *Liverpool*.
8.*Gifford, Joseph, 104, Strand.
9. Giles, Richard W., 52, Royal York Cresent, *Clifton*.
10.*Hanbury, Daniel B., Plough Court.
11. Hogg, Robert, 9, Albion Street, Hyde Park.
12. Murdoch, William, 113, Union Street, *Glasgow*.
13. Philpot, Henry, 32, Praed Street, Paddington.
14. Sandford, George W., 47, Piccadilly.
15.*Southall, William, 17, Bull Street, *Birmingham*.
16.*Squire, Peter, 277, Oxford Street.
17.*Watts, John, 107, Edgware Road.
18. Wooley, James, 69, Market Street, Manchester.

* Members of the present Council.

The following Members of the Society have been nominated as Auditors:

Allchin, Alfred, 32, Coles Terrace, Islington.
Constance, Edward, 37, Leadenhall Street.
Berden, Thomas, 6, Store Street, Bedford Square.
Moore, John Lodge, 1, Craven Place, Westbourne Terrace.
Orridge, Benjamin B., 30, Bucklersbury.

By order of the Council,
George Walter Smith, *Secretary*.

LIST OF MEMBERS, ASSOCIATES, AND REGISTERED APPRENTICES,

Elected in April.

MEMBERS.

ABERDEEN	Davidson, Charles	
	Forsyth, William	Castle Street
	Gordon, Alexander	Union Street
	Keith, James	8, Union Place
	Sim, James	
	Paterson, William	Gallowgate
	Shepherd, James	
	Sinclair, W.	
	Smith, John	90, Broad Street
	Sutherland, John	34, St. Nicholas Street
	Urquhart, J.	
	Williamson, P.	141, Union Street
ASHFORD	Ramsey, Henry Peake	High Street
BATTLE	Ward, Francis	High Street
BECCLES	Deacon, George F.	Northgate Street
BIRMINGHAM	Parker, John	53, New Town Row
	Phillips, John	Camden Street
BRIGHTON	Kemp, John	
BRISTOL	Townsend, John Henry	Cheltenham Road
	Sharland, Edmund Temple	28, Park Street
BURNHAM MARKET	Spencer, William Henry	Market Place
BURY ST. EDMUNDS	Youngman, Edward	19, Corn Market
CAMBRIDGE	Copeland, Joseph	
CARDIFF	Thomas, Morgan	High Street
CHESTER	Hincks, Thomas Robert	
CHESTERFIELD	Bettison, Joseph	Market Place
	Wright, James	Packers Row
CHIPPENHAM	Nicholls, William	
CLIFTON	Hogg, Henry	3, Berkeley Place
COLNBROOK	Jones, Henry	High Street
COVENTRY	Brown, Thos. Dudley	Hertford Street
CRANBROOK	Brothers, William	High Street
DEVIZES	Clark, Robert	Market Place
DEVONPORT	Row, Charles	Fore Street
EDINBURGH	Williamson, James	30, St. Andrew's Square
ELLESMERE	Lea, Samuel	Scotland Street
ENFIELD	Taff, John	
EPPING	Rowlands, Thomas	High Street
GLASGOW	Greig, William	New Apothecaries' Company
	Kennedy, William	59, Irongate Street
	Murdoch, William	113, Union Street
	Neil, John	69, South Portland Street
GLOUCESTER	Hayward, Samuel H.	Westgate Street
	Tucker, James	86, Northgate Street
GUERNSEY	Arnold, Adolphus	11, Commercial Arcade
	Satterley, William Browne	Fountain St., St. Peter's Port
HULL	Coatsworth, Thomas George	
	Healey, Samuel George	23, Queen Street
HUNTLY	Prott, Sen., William	Gordon Street
HYTHE	Thomas James	High Street
KINGSTON-ON-THAMES	Gould, Frederick	Heathen Street
LEEDS	Sagar, Henry	31, New Bond Street
LEWES	Saxby, Henry	37, High Street
LINCOLN	Holland, William Charles	
	Spencer, George	High Street
LITTLEHAMPTON	Smart, Nevil	High Street

LONDON	Bastick, Samuel	1, Ledbury Road, Kensington
	Bell, William Henderson	48, Albany St., Regent's Park
	Bromley, Richard M.	St. Paul's Road, Ball's Pond
	Cadyn, Thos. Arnold	12, Crosby Row, Walworth Rd.
	Deck, Arthur	10, Vigo Street, Regent St.
	Ellis, Wm. Scrivener	Lower Marsh, Lambeth
	Edwards, William Staples	14, Ethana Place, Dover Road
	Goldfinch, George	15, Goswell Street Road
	Good, Thomas	47, Minories
	King, Charles T.	86, Snow Hill
	Lavers, Henry R.	28, Old Street Road
	Mansell, William	Plough Court
	Rowe, Thomas Dowden	36, John St., St. John's Wood
	Saxby, William Simmons	11, Tothill St., Westminster
	Townson, Thomas	Plough Court
	Turner, Richard	2, Oxenden Street, Haymarket
	Wilkinson, William	114, Lambeth Walk
	Wright, Joseph	Brompton
LYMINGTON	Allen, Adam Underwood	High Street
MACCLESFIELD	Hodkinson, Henry	Mill Street
MANCHESTER	Hauser, John	78, Worcester Street
NEWARK	Hadfield, William Perkins	
NEWCASTLE-UND.-LYME	Caddick, John	High Street
NEWCASTLE-UPON-TYNE	Potts, Thomas	
OXFORD	Houghton, Thomas	High Street, St. Clement's
PLYMOUTH	Densham, John B.	Old Town Street
POOLE	Mullett, Edward	High Street
PORTSEA	Horsey, James	150, Queen Street
READING	Cooper, Lewis	Market Place
ROMFORD	Thurlby, John	High Street
SALISBURY	Prangley, Charles	Cheese Market
STAFFORD	Marson, James	
TEIGNMOUTH	Gould, John Granger	10, Wellington Row
USK	Edwards, John	
WARRINGTON	Peckton, Isaac	
WELLS	Shenstone, James B.	Stalth Street
WEYMOUTH	Groves, Thos Bennett	
WHITEHAVEN	Ramdkson, William	Roper Street
WHITTLESEA	Cole, John	Broad Street
WISBEACH, ST. PETER	Macdonald, John T. Lomas	Norfolk Street East
WOOLWICH	Lloyd, Thos. Henry	Albion Rd., Woolwich New Tn.
WOLVERTON	Harris, Joshua	Bury Street
WOKINGHAM	Spencer, Thomas	Market Place
YARMOUTH	Hewett, William Henry	

MAJOR EXAMINATIONS.

*Andrews, Frederick	Clapham
Baines, William Hibblethwaite	Halifax
Bates, James	York
Boulton, John George	Edinburgh
*Bryce, James	Dunfermline
Clarke, Thomas	Oxford
*Coleman, Abraham	Edinburgh
*Crarer, John	Blairgowrie
Duncanson, William	Glasgow
*Green, James	Droitwich
Handle, James	Falkirk
Helmritch, William	Kirkaldy
Hill, Thomas	Bicester
*Inglis, Hugh	Glasgow
*Kerr, Robert Seymour	Edinburgh
*Kinnimont, Alexander	Glasgow

Lacy, Henry	Edinburgh
Logan, Richard	"
Mackenzie, Henry	"
Matterson, Edward H.	York
*Penney, David	Edinburgh
*Proctor, Barnard S.	Newcastle
Robinson, Ralph	Durham
Reid, Neil	Perth
*Rolfe, William Adolphus	Wokingham
Seath, Alexander	Dunfermline
*Shiress, William	Brechin
*Walker, William	Northampton
Ward, Philip Daniel	Halifax
Wingate, Stephen	York
Wortley, John	Durham

MINOR EXAMINATIONS.

*Atkins, Ernest	Woolwich
*Bannister, Edward	London
*Booth, Alfred	Warrington
*Cleave, Charles	Chudleigh
*Corbett, William	Edinburgh
Doncanson, William	Glasgow
*Garvie, Alexander	Dalkeith
*Gover, Robert	Spalding
*Guyer, James	Southampton
Helmritch, William	Kirkaldy
*Inglis, Hugh	Glasgow
*Kinninmont, Alexander	"
Mackenzie, Henry	Edinburgh
*Ostler, Charles	Galashiels
*Penney, David	Edinburgh
*Rhind, William Weddle	Berwick
*Rodger, John	Glasgow
Seath, Alexander	Dunfermline
*Simpson, Robert	Edinburgh
*Watson, James	Montrose

* Those Candidates have obtained the Honorary Certificates.

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Andrews, Charles	Mr. Bally	Baldock
Atchison, William	Mr. Hewitt	London
Brangan, Henry	"	"
Fawcett, Christopher	Mr. Rountree	"
Rubbis, Frank	Mr. Hope	Wellingbro'
Richardson, Thomas	Mr. Bally	Baldock
Sanderson, Robert	Mr. Rogerson	Bradford
Taylor, Frederick	Mr. Fryer	Huddersfield

PHYTOLOGICAL CLUB.

17, Bloomsbury Square, April 4.

ROBERT BENTLEY, ESQ., F.L.S., &C., PRESIDENT, IN THE CHAIR.

A DONATION of British plants, from Mr. J. C. Braithwaite, was announced.

The consideration of M. Ville's paper, entitled "Experimental Researches on Vegetation," presented last month, stood adjourned until this meeting. In reply to a question, Mr. Penney stated that M. Ville's paper detailed the precautions taken in the experiments, upon which his important proposition, that plants can directly assimilate the nitrogen of the air, was founded. In abridging a report for the Pharmaceutical Journal, the particularization of those precautions had been omitted.

Mr. PENNEY exhibited a rose, admirably illustrating the influence of a plentiful supply of water to a plant when upon the point of flowering. The flower in question commenced to expand during a season of drought, when two or three days' rain changed the balance in favour of the nutritive functions; and whilst the corolla remained partially developed, the sepals of the calyx had become so to an enormous extent. A specimen of an aloe (which, as is well known, sailors often bring home as souvenirs of their tropical voyages), having the stem wrapped up in tarred canvas, and which had lived and increased for two years whilst suspended from the ceiling of a room, was also placed on the table by Mr. Penney, as an instance of vegetation at the expense of previously formed tissue, so far as the mineral elements were concerned.

Mr. REYNOLDS introduced the subject of the recent discovery of *Asplenium viride*, near Brighton, which had been communicated to the January meeting of the Botanical Society of London, by Mr. T. Moore (*Phytologist*, Feb., 1855). The fern in question had been found upon the walls of the Elizabethan mansion of Danny, a position very far south of its geographical limit in this country. It had here become established in such a manner as to induce Mr. Moore to speak of it as quasi-spontaneous, but his inquiries had not elicited any clue to its origin.

Mr. Reynolds wished to call attention to a fact recorded in Derham's Life of John Ray (*Memorials of Ray*, p. 22, published by the Ray Society), viz., that Ray spent the latter end of the year 1667 and the beginning of 1668 with his friends Mr. Barrel and Mr. Courthope, at Danny, in Sussex, both of those gentlemen having been his pupils at Trinity College, Cambridge. If, from this fact, the inference may be drawn that the owner of Danny at that period (Mr. Courthope) possessed tastes similar to those of his illustrious friend John Ray, may we not obtain a clue to the origin of the fern? It could not have been introduced by Ray himself, for that he was then unacquainted with it, is shown by its not being mentioned in his *Catalogus Plantarum Angliæ*, Ed. 2d., 1677. In his Synopsis (1690) it is given, but upon the authority of others. However, it appears probable that Mr. Courthope may have cultivated interesting native plants not included in the flora of his own neighbourhood, and his attention may well have been turned to the ferns, when it is considered how much was done by Ray to make that class of plants at all intelligible. Once established, a plant long retains its station. Specimens of Hutchinsia Petræa were exhibited to the meeting, from the walls of the churchyard at Eltham, the species having originally escaped from the garden of James Sherard, an Apothecary there, who died in 1728. That bricks may form a favourable groundwork for *Asplenium viride*, is shown by Mr. Newman in his *History of British Ferns*, whilst mentioning a station for it at Ham Bridge, Worcestershire. He says, "As I approached the bridge, the red bricks of which it is built, and the dry and dusty road which passed over it, seemed in no degree to increase the chance of success: yet on that bridge, facing the roadway, and covered with dust, was the identical plant I sought—small, indeed, but the species not to be mistaken." Mr. Reynolds referred to a brief notice of the subject in the *Phytologist* for April, in which Mr. Newman had extended the suggestion he had made to him, by referring Ceterach and Dryopteris to a similar origin.

Mr. WILLIAMSON was personally acquainted with the flora of the neighbourhood in question, and could state that it contained many plants which had certainly been introduced. These were particularly numerous in a wood immediately at the back of the mansion. He considered the most satisfactory way of accounting for their presence, was by supposing that a former owner of Danny had been a lover of Botany and had cultivated them.

The attention of the meeting was called to a vegetable substitute for horse-hair in upholstery. Chairs, &c., stuffed with this material, which is called American moss, are exhibited for sale in shops in London. At a first glance it bears a general resemblance to horse-hair, but a closer inspection shows numerous joints. It is the produce of Tillandsia usneoides (*Bromeliaceæ*), an epiphytic plant which hangs abundantly upon the Cypress trees on the banks of the Mississippi river. The pine-apple belongs to this order, the plants composing which have usually strong fibres, and in many parts of the globe are employed for making cordage, cloth, &c.

The American moss possesses some elasticity, but will not compare in this respect with horse-hair. Its original cost is much less than horse-hair, but it is said to crumble after being in use for some time. The Tillandsia usneoides would appear to

have a more direct claim to the interest of the Pharmaceutist, as Dr. Lindley states that it is used in the preparation of an ointment against hæmorrhoids. The fact that the indigenous Carrageen (*Chondrus crispus*) used to be rather extensively collected on our coasts for use in stuffing mattresses, was mentioned.

The President announced that the next meeting would be held on Monday evening, May 2nd, at a quarter before nine o'clock.

PROVINCIAL TRANSACTIONS.

THE GENERAL ADOPTION OF THE PHARMACY ACT IN SCOTLAND. MEETING AT GLASGOW.

A LARGE party of the Chemists and Druggists of Glasgow assembled at breakfast, on Friday the 1st of April, at Stimpson's Globe Hotel, Great Clyde Street, to meet Mr. Jacob Bell, who had visited Glasgow for the purpose of explaining the nature and operation of the Pharmacy Act, and who was supported by a deputation of the Pharmaceutical Society from Edinburgh. Mr. William Greig presided, and among the visitors present were Dr. A. D. Anderson, President of the Faculty of Physicians and Surgeons, Dr. James Watson, the late President of that incorporation, Dr. George Walker Arnott, Professor of Botany, Dr. Couper, Professor of Materia Medica, Dr. Anderson, Professor of Chemistry, Dr. Penny, Andersonian, Dr. Easton, &c. Hugh Hart, Esq., occupied the Vice-Chair. After breakfast, the Chairman having introduced the business,

Mr. JACOB BELL was invited to address the meeting. He commenced by narrating the circumstances which led to the introduction into Parliament of the Pharmacy Bill. In several medical bills introduced twelve or fourteen years ago, it was proposed to provide for the improved education of Chemists and Druggists, but it was also proposed to place them under the Society of Apothecaries, to which they offered a strong opposition. The Chemists themselves began to see that unless they bestirred themselves, they would be continually liable to attacks of this description. Some of them, taking into consideration the superior state of education in their profession in every other civilised country, and knowing how far England was behind other nations in this respect, felt that it would be exceedingly discreditable to them to continue longer in that position. The question was, how were they to apply a remedy? They refused to allow themselves to be placed under the medical profession, and resolved to form themselves into a Pharmaceutical Society. They agreed that the Members of the Society should be in future admitted by examination; but in order to form a nucleus for its commencement, all Chemists and Druggists who chose to become Members at the outset were allowed to enter without examination. The Society was established in the year 1842, and in 1843 a charter of incorporation was obtained, according to which no person could be admitted without examination, or being certified to be duly qualified. As no School of Pharmacy existed in this country for preparing Chemists and Druggists for examination, an institution was established in Bloomsbury Square, where courses of lectures were regularly delivered. They had adopted a separate curriculum of their own, because by attending the ordinary medical classes the attention of young Chemists was diverted from the studies proper to their profession. In the Society's institution the attention of students was devoted to pure Pharmacy. Although the medical profession had constantly complained of the incompetence of Chemists and Druggists to perform their own functions, yet when the Chemists resolved in this way to educate themselves, the principal opposition they had to encounter came from medical men. No doubt the practice of prescribing over the counter existed to some extent amongst Chemists and Druggists, and when they projected the present plan of education, the medical profession were jealous of the movement, lest it should result in their setting up as doctors, and taking away the practice of the medical men. But this was not what the Chemists had in view. They were anxious to discourage the practice of prescribing over the counter. Their desire was to encourage Chemists to mind their own business, and medical men to mind theirs, because every man knew his own business best. The jealousy of the medical profession had since greatly subsided; and he believed that if such a bill were now to be discussed in Parliament, it would meet with a very different reception. Mr. Bell next referred to the clause in the Act excluding medical men from the

Society, as an evidence, not, as had been supposed, of their wishing to deprive them of any advantage, but of their desire to make the widest possible distinction betwixt the two professions, so as to prevent the one from encroaching upon the other. Referring to the importance of raising the standard of professional education and character, he observed that they ought to have higher views than those of mere tradesmen. So long as they rested contented with the present amount of professional training, they would undoubtedly expose themselves to taunts of incapacity in their profession. It might be objected that to require a higher amount of education on the part of young men coming forward to the business, was equivalent to the establishment of a monopoly, by excluding all who were unable to bear the expense; but it might be objected with equal reason that the son of a poor man was disqualified from becoming a banker, in consequence of his being unable to provide the requisite capital. It was of great importance, Mr. Bell proceeded to observe, to carry Scotland along with England in working out this plan. Not only would their united strength and influence be invaluable in carrying the objects of the Society into effect, but in the protection of their common interests in the event of their being affected by future legislation. The Society already numbered about 1800 Members, and betwixt 300 and 400 Associates, and large numbers were coming in daily. They did not want to tax Scotland for the support of a local institution in Bloomsbury Square; what they wanted was the concentration of the whole body of the profession, in case of attack from without, and for the purpose of organization for their own improvement. Their object also was to establish a uniform education throughout the country. Medical education was far from being uniform. The different universities occupied a position of rivalry towards each other; and the Pharmacopœia of England, Scotland, and Ireland, differed in the most important particulars, causing great inconvenience by the variety of the formulæ and consequent ambiguity of the terms employed by the London, Edinburgh, and Dublin Colleges. They ought to aim at establishing a national Pharmacopœia, and he believed that the union of their own profession would indirectly lead to the more harmonious co-operation of the medical profession. Mr. Bell then spoke of the arrangements of the Scottish Board under the Pharmacy Act, observing that as the President and Vice-President of the Pharmaceutical Society were *ex officio* Members of this Board, they would have it in their power, by occasionally attending the meetings in Scotland, to promote a uniform system of education and examination. The Board might sit in Edinburgh, Glasgow, or Aberdeen, as the Council of the Society might think fit; and the Members of the Board might be elected from each of the three cities. For example, Edinburgh might have four Members of the Board, Glasgow two, and Aberdeen two; but all these arrangements could be adjusted afterwards. Mr. Bell concluded by warmly recommending the union of England and Scotland in this measure, so as to identify the interests of the Chemists and Druggists in the southern and northern parts of the Island.

Dr. COUPAR expressed his satisfaction with the statement of Mr. Bell, and had no doubt that the plan which had been so clearly sketched to them would be productive of great immediate and prospective benefit both to the public and themselves.

Dr. A. D. ANDERSON also spoke in approbation of the plans of the Society, recommending that the medical profession should aim at having one Pharmacopœia.

Dr. WATSON explained the grounds on which the Faculty of Physicians and Surgeons of Glasgow had opposed the Pharmacy Bill in its original form, and expressed the warmest approbation of the Act as it finally passed. He also acknowledged the courtesy with which Mr. Bell had received the deputies sent up from that city to oppose the original bill. The Act, as it finally passed, was quite sufficient for associating the Chemists and Druggists in elevating the character of the profession, and the amendments removed all the objections which the Faculty as a corporation had against it. The progress of the division of labour was tending more and more to separate the two professions. There was not one medical man dispensing medicines in Glasgow at present for twenty who followed the practice within his own experience; and he would be glad to see it discontinued altogether, as he believed that nothing would conduce more to the improvement of both their professions than such a division of labour. The bill having been altered so as to suit their views, he had great satisfaction in congratulating Mr. Bell on its being passed in its present form, and strongly recommended the gentlemen around him to take advantage of it.

Dr. G. WALKER ARNOTT inquired of Mr. Bell what was the nature of the education

contemplated for Scotland? It could not be expected that young men would go from Scotland to Bloomsbury Square for their education. He added a few spirited remarks on the proposed unequal distribution of the members of the Board, claiming for Glasgow, on the ground of its great importance and intelligence, at least an equal number of members with Edinburgh, and that it should not be placed on a level with Aberdeen. He could only account for the proposal on the supposition that it required four Edinburgh men to furnish the same amount of brains which might be found in two Glasgow men.

Mr. Bell said that in referring to the proportion of members of the Board for the three cities, he was not assuming that any proportions had been fixed. This would be matter for subsequent arrangement, and the great object in the mean time should be, to get rid of any jealous feeling betwixt the two cities. He deprecated any rivalry of that kind betwixt Edinburgh and Glasgow, and hoped that they would be disposed to co-operate harmoniously in the undertaking before them. The method of education in Scotland would be left for arrangement by the professors there, one of whom had consented to divide his course of lectures on Materia Medica into two parts, in order to accommodate pharmaceutical students preparing for examination. Mr. Bell stated that the lectures in Bloomsbury Square were intended, in the first instance, for a temporary purpose, and their continuance would depend upon circumstances. The school had been set up as a model, to show the kind of education which Chemists and Druggists required.

Dr. Penny spoke approvingly of the plan as a movement in the right direction, and inquired into the nature of the curriculum of study and examination.

Mr. Bell replied that the curriculum consisted of Chemistry, Pharmacy, Materia Medica, Botany, and the Chemistry of Poisons.

Dr. Easton expressed his admiration of the liberality and comprehensiveness of Mr. Bell's views, observing, that at the organization of a new institution, it was gratifying to see that it was established on such principles. It was only by each man prosecuting his own profession, that they could expect success in it. Dr. Easton joined in the strong recommendation already given in favour of a national Pharmacopœia.

Mr. Hart moved, "That in the opinion of this meeting it is highly desirable that the Chemists and Druggists of Glasgow and the west of Scotland avail themselves of the opportunity now afforded them to enrol themselves as Members of the Pharmaceutical Society. *Resolved*—That Messrs. Greig, Hart, William Murdoch, D. Campbell, D. Fraser, Currie, Templeton, and James Murdoch the local secretary, be appointed a Committee, with power to add to their number, to ascertain and certify to the qualification of those who desire to be admitted into the Society, and report the same to the Council in London."

Mr. James Murdoch seconded the motion, which was approved by the meeting.

Mr. William Murdoch moved, "That this meeting, impressed with the importance of a liberal scientific education being acquired by those who may afterwards become Members of this Society, instruct the Committee to adopt such measures as will best accomplish this object."

Mr. Daniel Fraser seconded the motion, which was carried *nem. con.*

Mr. Currie moved, "That this Meeting tender their sincere thanks to Mr. Jacob Bell for his able address, to the President of the Faculty of Physicians and Surgeons, the Professors of Botany, Chemistry, and Materia Medica, the deputations from Edinburgh and other places for their countenancing this meeting, and the interest they have manifested in this movement."

Mr. Templeton seconded the motion. He referred with satisfaction to the lucid statement of Mr. Bell, who had done them the honour to be present on the occasion of initiating the movement in Glasgow, and the approving observations made in reference to it, and to the propriety of the Druggists of Glasgow forming themselves into a body in connexion with that Society, by the professors and members of the medical profession, with whose presence they had also been honoured, together with the interest manifested in their proceedings by the gentlemen who had kindly come as a deputation from the Pharmaceutical body in Edinburgh.

The motion was carried *nem. con.*

Mr. D. Campbell then moved a vote of thanks to the Chairman, which closed the proceedings.

MEETING OF THE SOCIETY OF CHEMISTS AND DRUGGISTS, ABERDEEN.

MR. P. WILLIAMSON IN THE CHAIR.

Present—Messrs. Urquhart, Forsyth, Keith, Sutherland, Sangster, Findley, Smith, H. Williamson, Andrew, Burness, and Davidson.

The Meeting had been convened to consider the propriety of uniting the Association with the Pharmaceutical Society of Great Britain; and Mr. Jacob Bell attended for the purpose of giving information respecting the constitution, objects, and position of the latter Society.

The Chairman having stated the purpose of the Meeting, observed, that since the passing of the Pharmacy Act, it had been thought desirable by the Members of the Society to avail themselves of the opportunity now afforded of uniting in the adoption of a measure, the tendency of which would be to promote education, and raise the character of the Pharmaceutical body. Mr. Bell, who had visited them for that purpose, would explain in detail the terms and conditions on which they might be admitted as Members of the Pharmaceutical Society, and the probable advantages to be derived from this union.

Mr. Bell observed that no argument would be necessary on his part to show the advantage of union and co-operation among the Members of the Pharmaceutical body, as they had a Society at Aberdeen which he believed had been formed a year or two before the establishment of the Pharmaceutical Society. They had, therefore, acquired the habit of associating together, and it only remained for them to consider the expediency of merging their local Association in the Pharmaceutical Society of Great Britain. This need not interfere with or supersede their previous arrangements among themselves, and the proceedings which they had instituted for the promotion of education. They might continue to hold their meetings and maintain a library, &c., but they would do so, not as a small isolated society, but as a branch of a large one, extending over the entire kingdom, and recognized by Act of Parliament. The existing bye-laws afforded facilities for Chemists who had been established in business before June 30, 1852, to join the Society, but these bye-laws would in a few weeks cease to be in force. It was, therefore, important to come to an early decision on the subject. Mr. Bell briefly explained the objects and constitution of the Society, the circumstances under which it had been established, and the mode in which it would operate in raising the status of Pharmaceutical Chemists. He took a cursory review of its progress in England, and its recent extension in the north, the proceedings in Edinburgh and Glasgow, and the arrangements which had been made for securing uniformity of qualification by the mode in which the two Boards of Examiners are constituted.

Mr. Davidson inquired whether the Members of the Aberdeen Association could be admitted in a body, a list being furnished by the Secretary, and transmitted to the Council in London. He also inquired on what terms they could be admitted.

Mr. Bell replied that it was necessary for each Member to be separately certified, with the dates of his entering the business as an apprentice or pupil, and commencing on his own account. He had brought with him some blank certificates for this purpose, which might be filled up after the Meeting. The terms of admission were two guineas entrance, and one guinea annually, or ten guineas for Life Membership.

Mr. Davidson thought an admission fee of £10 would be sufficient without an additional entrance fee, considering that the Society in Aberdeen had been in existence longer than the other, and that the Members had already contributed largely to its funds, in establishing a library, and providing other means for the education of their apprentices. He thought at least one Member of the Board of Examiners for Scotland should be appointed from Aberdeen, and that the Examiners should meet there once a year.

Mr. Bell.—The terms of admission are settled by the bye-laws, and it is impossible to deviate from these terms. The original Members who have subscribed for twelve years, think they have borne the burthen and heat of the day, and consider an entrance-fee of two guineas from new Members by no means an

equivalent for the expense they have themselves incurred in bringing the Society into its present position. The appointment of Examiners is a matter to be arranged by the Members in Scotland, subject to the approval of the Council, as the Act of Parliament contains no restriction on this subject.

Mr. Urquhart—Is it necessary that all Apprentices should be registered?—and what is the nature of the classical examination?

Mr. Bell—The Act of Parliament is not compulsory; but all who desire to be connected with the Society must comply with the regulations. The classical examination is at present a very lenient one, and may be conducted by any competent person—schoolmaster, medical man, &c. The object of the examination is simply to ascertain that the youth has had a liberal education and knows enough Latin to enable him to translate the Pharmacopœia and prescriptions. It is probable that the stringency of this examination will be increased at a future time, but it is necessary to proceed by degrees in the introduction of these regulations. On the Continent the young men undergo a very severe preliminary examination, comprising two or three languages, mathematics, natural philosophy, &c. This is the case also in Ireland, where the dispensing Chemists are all educated as Apothecaries.

Mr. Burness—In what manner are the funds of the Society expended? What proportion is expended on the laboratory, library, and lectures in London, and are the books circulated among the country Members?

Mr. Bell—The expenditure of the Society is published in the Annual Report. It comprises rent, rates, taxes, salaries of officers and servants, law charges, printing, postage, &c. The educational establishment entails an expense of between £400 and £500 per annum. This is not for the benefit of London Members exclusively; Members in the country may send their sons or apprentices to the school. The books are circulated within a reasonable distance. The amount expended on education has a beneficial influence on the character of the Society, and contributes to the supply of competent Assistants. It is impossible for each individual in the Society to enjoy precisely the same amount of benefit from such an establishment, although all participate in the improved status resulting from the introduction of a higher standard of education in the Society. Those who attend the practical class in the laboratory pay fees of thirty guineas for a session, or a higher ratio for shorter periods. It is not expected that Students will go from Scotland to London for their education, having three universities, Edinburgh, Glasgow, and Aberdeen. But the school in London was established to supply an existing demand, and to promote the introduction of a special Pharmaceutical education apart from that provided for medical students. It might at a future time be found unnecessary to continue the school, but at present it is considered an important feature in the proceedings of the Society.

The explanation was received as satisfactory, and after some further discussion respecting the management of the Society, the election of officers, the examinations, &c.,

Mr. Davidson moved the following resolution: "That the thanks of this Meeting are due to the Council and Members of the Pharmaceutical Society of Great Britain; and that the Members of the Society of Chemists and Druggists in Aberdeen testify their approval by becoming Members immediately."

Mr. Urquhart seconded the resolution, which was carried unanimously.

It was understood that Mr. Davidson would act as local Secretary for Aberdeen, that the proceedings of the Society should be conducted as before, and that endeavours should be made to improve the means of education, by encouraging Apprentices to attend lectures. It was also proposed that meetings should be held for scientific discussion.

The thanks of the meeting were voted to Mr. Bell, and also to the Chairman.

THE DINNER.

In the afternoon of the same day several of the Members dined together at the Aberdeen Hotel, with the President and office-bearers of the Aberdeen Medical Society, namely, Drs. Kilgour, Smith, Fraser, and Redfern.

Mr. Williamson, the Chairman, in the course of the evening, stated, that it had been proposed to invite the medical practitioners of Aberdeen to the meeting which had taken place in the morning, in order to remove any misunderstanding that might exist respecting the objects of the Pharmaceutical Society, and to convince them that nothing more was intended than the improvement of the Chemists in their own legitimate pursuits. He had been informed, that at meetings which had been held elsewhere, medical men had been invited for the above reason; but it was the opinion of the Members of the Society in Aberdeen that such a course was unnecessary there, as no jealousy existed between the Medical Men and the Chemists, and that a social meeting in the evening would afford an opportunity for any explanation that might be desirable on the subject.

Dr. Kilgour, the President of the Medical Society, congratulated the Chemists on their successful exertions to raise the character of their branch of the profession, by the introduction of an improved education and an examination, and he thought nothing could tend more to effect this object than the combined and straightforward exertions of the whole body of Chemists throughout the kingdom. He was sure he spoke the sentiments of all his professional brethren in this locality, when he said he was confident that no jealousy would be felt by them or by any one who had read the Pharmacy Act dispassionately and without prejudice. He considered that it would be the means of abolishing the mode too common in the south (although never prevalent in this city), of remunerating Medical men by the amount of medicines furnished. In Aberdeen the division of labour in this respect was almost universally adopted. He knew of but two or three exceptions, and these to a limited extent. The rule was that the Medical man prescribed, the Chemist dispensed the medicine. No jealousy existed, and the utmost harmony prevailed. They had among them some very intelligent and qualified Pharmaceutists. The proceedings of the Society would tend to make these qualifications more general.

Mr. Bell, at the request of the Chairman, made a few observations on the Pharmaceutical Society, the Pharmacy Act, and the extension of its operation throughout the kingdom. He had always been an advocate for the division of labour, and the independence of Pharmacy as a distinct branch of the profession, having a special education and a regular organization of its members. He was glad to find that these principles, which he had often been told were Utopian and impracticable, were actually carried out in Aberdeen with that success which in theory he had predicated. Some difference of opinion existed respecting the extent of the education the Pharmaceutical Chemists ought to possess. He maintained that they ought to be fully acquainted not only with the chemistry and natural history of the agents used in medicine, but also with the properties, doses, and ordinary mode of administration. In a case of poisoning the Chemist ought to be able to detect the poison and furnish the antidote. Here his duty ended; the further treatment would develve on the Medical man. In the event of a mistake in a prescription, a dangerous dose being ordered by accident, the Chemist ought to prevent mischief by waiting on the Medical man to ascertain what was intended. The Chemist also should be familiar with new medicines and preparations when introduced, as he was likely to be applied to by Medical men for information on such subjects. Jealousy between the two branches of the profession was quite unnecessary, and ought to be discouraged; it was gradually subsiding in many places. The union of the Chemists might be taken as a practical reproof to the medical profession, the several branches of which were at variance with each other, which obstructed the progress of medical reform. They could not even agree about the formulæ in the Pharmacopœia, and the existence of three Pharmacopœias instead of one national one caused endless confusion and sometimes danger to patients. The Pharmaceutical Society had now acquired a position which enabled it to exercise a beneficial influence on the rising generation of Pharmaceutists. Apprentices and Assistants were applying themselves to study and inquiring what books they should read to prepare them for passing the examination. Thus a general stimulus was given to education, and the effects would become manifest in the course of a few years. The labour and expense of establishing the Society having been incurred by the Members in the South, they now invited their brethren in North Britain to share the result, and assist in promoting the future progress of the undertaking. The concentration of the influence of the Pharmaceutical Body in one Society was much to be desired.

Several gentlemen present expressed their approval of this proposition, in support of which an allusion was made to the injury sustained by the University of Aberdeen,

in consequence of a clashing of interest between two colleges, either of which could be maintained in a flourishing state, while the division of influence and resources was ruinous to both. They also warmly supported the proposition in favour of a national Pharmacopœia.

The health of the Earl of Aberdeen having been proposed after the usual loyal toasts, Mr. Bell took occasion to observe that the Pharmaceutical Society was much indebted to that nobleman. It was mainly through the influence of Lord Aberdeen that the Charter was obtained in 1843, and the same influence was extended in favour of the Pharmacy Bill, when passing through the House of Lords under the charge of the Earl of Shaftesbury.

Before the company separated, most of the Members of the Aberdeen Society of Chemists filled up forms of application for admission into the Pharmaceutical Society; but the forms of application and certificates which Mr. Bell had brought with him being insufficient, a letter was written to the Secretary in London, requesting him to send a further supply.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

On Monday, the 4th of April, the Second Anniversary of the North British Branch of the Pharmaceutical Society was held at the Society's Rooms, Princes Street, Edinburgh.

Mr. JOHN DUNCAN having been called to the Chair,

The Secretary, Mr. JOHN MACKAY, read the Annual Report of the Committee, as follows:—

REPORT.

In bringing this the First Annual Report before the Meeting, the Committee have much pleasure in congratulating the Members upon the rapid advancement and steady progression which has been made by the Scottish Branch of the Pharmaceutical Society of Great Britain.

In laying the following statement before the Society, the Committee have confined themselves to the year 1852; and the remarks about to be made, with the financial account to be submitted, comprehend the period betwixt 1st of January and 31st December of that year.

During the time above referred to, the Board of Examiners have held four meetings. On these occasions the aggregate number admitted by examination were 27 Members, 40 Associates, and 11 Registered Apprentices—in all 78. In addition to these there have been 19 Members admitted by certification through the Secretary in Edinburgh, irrespective of those who applied for admission to the Society by sending application and certification to the Council in London.

Thus 97 Members, Associates, and Pupils, have been added to the Society during the past year; and if those be included whose names have not passed through the books in Edinburgh, it will give numerically considerably more than 100 individuals who have joined the parent Association during the bygone year, all of whom are resident in Scotland.

Adding the above number to those already connected with the Society, and looking forward to the promised support from Glasgow, Aberdeen, and elsewhere, the Committee cannot but confidently expect that a very considerable list of names will be added to the existing adherents of the Society during the current year, as there still remain a goodly number connected with the drug trade, who, from their respectability and long standing, are both eligible and desirable as Members of the body.

The accounts with vouchers having been examined and audited by parties appointed at the last Meeting of Committee, have been found correctly stated, and are now submitted to the Meeting for approval.

Dr. *Cr.*

Vouchers		£	s.	d.
Nos. 1 & 2	Printer's accounts	3	2	6
	Cash Book	0	2	0
	Minute Book	0	11	0
	Charter Box	0	17	0
	Expenses canvassing Drug Trade for Members, &c.	0	12	6
3 & 4	Advertising	2	4	0
	Circulars throughout Scotland	0	17	8
5	Hire of Ferms	0	13	0
	Scissors, 1s.; Towels, 2s.	0	3	0
	Expenses connected with Petitions	1	1	6
	Shelving	0	3	6
	Large Envelopes for Examination Certificates	0	3	9
	Incidental Expenses, comprehending Porterage, Doorkeeper, Cleaning Rooms, Coals, &c., as per Cash Book	2	19	11
	Various Postages throughout the year	3	1	3
6	Rent of Rooms, York Place	4	12	6
7	Carpet, &c.	4	16	5
8	Grate, Gas Fittings, &c.	1	12	9
9	Painter's Account	1	10	8
10 & 11	Show Case	6	6	0
12	Specimen Jars	17	14	6
13	Specimen Goblets	5	13	6
14	Show Bottles	0	7	3
15	Brass Plate	0	18	6
16	Rent to 11th November	11	0	0
17	Pol. Assessment	0	16	8
18	Labels for Museum	1	18	0
19	Ink Stand	0	5	6
	10 Chairs	5	12	0
20	Writing Table	2	10	0
		£82	6	10

1852		£	s.	d.
January	By Cash from London	25	0	0
July	Ditto, ditto	20	0	0
Dec. 31.	By Balance due Secretary	37	6	1
		£82	6	10

1852
Dec. 31. To Balance due Secretary £37 6 10

Edinburgh, 28th March, 1853.

We have examined the annexed account and vouchers which are correct, and find the balance due to the Secretary amounts to thirty-seven pounds six shillings and tenpence sterling.

WILL. AINSLIE.
JAMES GARDNER.
WILLM. AITKIN.

It will be observed from the preceding statement that the principal expenditure has been in connexion with the Museum. The furnishing necessary for the room, with the glass cases and specimen jars, have more than exhausted the sum voted by the Council with which to commence operations. The Committee beg to thank those Members who have so liberally presented the Society with many valuable and interesting contributions.

The Committee regret that up to the present time so little has been done on behalf of the Library, being satisfied that it is very desirable a select number of instructive books should be obtained and made available for the juniors residing in Edinburgh and neighbourhood. Having received some promises from various parties, the Committee beg to remind Members that they will gladly receive any volumes from those disposed to place them at their disposal for the benefit of the Society.

The Committee have not yet considered themselves warranted in expending any of the funds in the purchase of specimens for the Museum or books for the Library, but hope soon to be in a position to give the subject due consideration.

In connexion with the two previous departments, the Committee trust that the Council in London will, now that a certain measure of success has attended the

efforts made to gain support to the Society from Scotland, make an annual grant of funds beginning with the current year, for the purpose of strengthening the Scottish Branch here. If this be done, not only will it enable the Committee to increase in usefulness by extending the Museum and Library, but also prove the means of enabling them to do something in behalf of Pharmaceutical education, and thus induce the younger Members of the Society to increase their knowledge of the different branches of study connected with their business.

The Committee would be wanting in proper feeling of gratitude did they not speak in high terms of the kind manner in which the honorary Members resident in Edinburgh have always interested themselves in the progress of the Society, and have especially to thank Dr. Christison, Dr. Douglas Maclagan, and Dr. George Wilson, for their valuable contributions to the scientific Meetings.

With the certainty of the Pharmacy Bill about to become the law of the land, the Committee cannot refrain from noticing the deep obligations which they feel the Society is under to Jacob Bell, Esq., for his unwearied efforts in behalf of the Association. With a kindness, liberality, labour, and ability but rarely witnessed, he has been most energetic in his endeavour for everything likely to be of service to the body of Chemists at large; and the Committee cannot doubt that it is mainly owing to his untiring and indefatigable exertions that the Pharmaceutical Society of Great Britain is now surmounting its difficulties, and reaching an eminently high position both in this country and abroad.

The Committee cannot conclude their Report without taking the opportunity of testifying their deep and unfeigned regret for the loss sustained by the Society in the death of Mr. W. R. Davenport, one of the Examinators. Upright and conscientious in all his dealings, with an earnest feeling for the success of the Pharmaceutical Society, of which he was one of the Founders, his attendance at the meetings when health permitted, was unwearied, and his exertions on behalf of the Society, continued and persevering.

Edinburgh, 2nd April, 1853.

Mr. John Shaw moved the adoption of the Report. He said it was a source of great pleasure to him, as it would be to all present, to hear of the prosperity of the Society, and when it was recollected that this branch of the Society had only been regularly organized about eighteen months, he thought they had every reason to be encouraged. It would be observed in the financial statement, that the principal item in the expense was in connexion with the Museum, and this of course would not need to be repeated. With reference to the establishment of a Library in connexion with the Society, he hoped the Committee would be supported in their efforts in this department, by the Members. While he gave his unqualified support to the Report as it stood, he noticed the omission of a proper acknowledgment of the services of their indefatigable Secretary, Mr. Mackay. He therefore moved, as an addition to the Report, to the effect "that the Committee were sensible of, and acknowledged the very valuable services rendered to the Society, by their Secretary, Mr. Mackay, who had devoted much of his time to their business, without fee or reward, and who had contributed greatly by his uniform kindness, courtesy, and conciliatory demeanour, to encourage others in forwarding the welfare of the Society."

The motion was carried by acclamation, and the Chairman formally conveyed the thanks of the Meeting to Mr. Mackay, who briefly replied.

Mr. Jacob Bell said he was anxious to make a few remarks on some of the subjects arising out of the Report. He was very glad to find that the Society had received so considerable an accession to its numbers in Edinburgh, and that there was also a prospect of uniting Glasgow and Aberdeen in this most useful undertaking. He had recently visited both places, and he was glad to say that a general desire was evinced in both places to unite with their brethren in Edinburgh. In Aberdeen a meeting was held on Saturday, the result of which was that the Chemists came forward at once and joined the Society. An Association having a similar object in view had previously been established in that town, and it required no argument on his part to induce the Members to join the Pharmaceutical Society, which comprises the entire kingdom, instead of continuing as a small local association. In Glasgow, a meeting was held on Friday last, and in that city also a very general desire was evinced to join the Society, and he had no doubt the result would be that from twenty to thirty names would be added to the list of Members. A desire was

expressed that Glasgow should in future be represented in the Board of Examiners. The Pharmacy Act provided that a separate Board of Examiners should be appointed for Scotland, and that they should sit in Edinburgh, Glasgow, or such other place as might be appointed. It was, therefore, entirely an open question as to where this Board should meet, and of whom it should be composed. At present, all the proceedings in Scotland were conducted at Edinburgh, but he hoped by next year, that branches of the Society would be formed both in Glasgow and Aberdeen, and it would then be seen what number of Members should be placed upon the Board from each place. In Aberdeen, also, a desire was evinced to be represented in the Board of Examiners; and for his part, he could see no objection to the appointment of some of the Members in Aberdeen, as he thought it was from such combinations that the North British branch of the Society would greatly strengthen the hands of the other branch in England. The head-quarters of the Society were, doubtless, in England; but it was felt that as there was but one object to promote, the words Scotland and England should be discarded, and the words North and South Britain adopted, in order to promote unity between the several branches of the Society. He trusted that, by carrying on their operations in this manner, the Society would set an example to the medical profession; so that, instead of having such a rivalry as they at present had in the matter of the Pharmacopœias, they might be induced to follow their example, and come to an agreement on this point. There was another subject to which he wished to refer, namely, the making of grants of money by the parent Society. There was some little difficulty attending the giving of these grants; because if a grant was given to one place, the Members in another place might think they were entitled to one also. The Council in London had no desire to make use of the subscriptions of the Members in Scotland for purposes which were exclusively applicable to England; and in the case of Museums, and other expenses which were required for conducting the business of the Society, whatever might be the locality, it was quite proper that a portion of the contributions which were given to the parent Society, should be appropriated to the promotion of these objects. In cases such as these, the great desire on the part of the Council was to work harmoniously with the different branches; and he had no doubt this would be effected. In reference to the appointment of the Board of Examiners for Scotland, he might mention that the Members in Scotland were anxious that this should rest with them alone; but as the Act provided that they were to be appointed by the Council, the matter had been arranged by the Council agreeing that the Members in Scotland should send up a list of those whom they wished appointed, and that the Council should make the appointment. It was by such a spirit of friendly co-operation that the Society would prosper; and he hoped that they would continue to carry this spirit of mutual forbearance into all their proceedings, assured that they would in this way benefit the Society, and ultimately the public at large.

The meeting thereafter proceeded to elect Office-bearers for the ensuing year, as follows:—

President—J. F. Macfarlan, Esq. Vice-President—H. C. Baildon, Esq.

Recommended as Examiners—Messrs. Aitken, Baildon, Bremner, Flockhart, Gardner, Macfarlan, Mackay, Shaw, and the President and Vice-President in London, *ex officio*.

Committee—Messrs. Aitken, Ainslie, G. Blanshard, Bremner, Flockhart, Fairgrieve, Gardner, Lindsay, Hart of Glasgow, Shaw, Smith, Young, and the President and Vice-President of the North British Branch. Mr. John Mackay, Secretary. Curators of Museum and Library, Messrs. Ainslie and Shaw.

It was then agreed, on the motion of Mr. Robertson, seconded by Mr. Shaw, to support Mr. J. F. Macfarlan as the representative of the Society at the Council for the ensuing year. Some discussion ensued as to the desirability of having other towns represented as well as Edinburgh in the Board of Examiners; but the motion to this effect was withdrawn, on the explanation of the Secretary, that in the meantime there were not sufficient members in any of the provincial towns to entitle them to be represented in the Board of Examiners.

Mr. Mackay, the Secretary, then moved the following resolution, of which he had given notice:—"That it is expedient, in order to assist in carrying out the provisions of the Pharmacy Act, to render it imperative that all future apprentices to Pharmaceutical Chemists in Edinburgh, Glasgow, Aberdeen, St. Andrews, and other places

where lectures are delivered, shall attend at least one course of Materia Medica and one course of Chemistry, and resolve that this meeting strongly recommend an especial clause in each indenture to this effect." In supporting his motion, Mr. Mackay stated, that at no time was there a greater call for increased education among Druggists' apprentices than at the present time. It was not, however, easy for some apprentices to attend such lectures; and, in order to obviate this objection, the committee had made a proposition that practical classes should be opened by Mr. Roeding, under the auspices of the Society, and that the lectures should take place at such an hour as would leave the parties without excuse if they neglected to attend them. Mr. Roeding had also agreed to make the instructions of that practical kind which would enable apprentices to gain a large amount of knowledge in as brief a period as possible.

Mr. BREMNER seconded the motion, which was carried unanimously.

The question arose whether or not it would be advisable to include Practical Chemistry and Botany in the course of instruction; and on the motion of Mr. ROBERTSON, seconded by Mr. H. C. BAILDON, it was agreed that the Society should recommend the pupils to attend these latter courses whenever they had the opportunity of doing so.

After some discussion respecting the provisions of the Pharmacy Act, and the co-operation of the Chemists in North Britain with their brethren in the South in promoting its general adoption, votes of thanks were passed to Mr. Bell and to the Chairman, and the meeting separated.

THE DINNER.

The Members of the Society and their friends sat down to dinner in the evening in the Archers' Hall. The company was numerous and highly respectable, and the chair was occupied by Dr. Douglas Maclagan, supported by Professor Traill, President of the Royal College of Physicians, Professor Christison, Dr. Combe, President of the Royal College of Surgeons, Drs. Begbie and Gairdner, J. T. Alexander, Surgeon, Messrs. Jacob Bell, John Duncan, Gardner, Bremner, Flockhart, Templeton (Glasgow), and Hart (Glasgow). Mr. H. C. Baildon discharged the duties of croupier, supported by Mr. J. R. Raimes, Mr. James Robertson, Mr. Brown (Dunfermline). Among the other gentlemen present were — Messrs. Lindsay, Fairgrieve, Shaw, Ainslie, Mackay, Bagot (London), Scott (London), Tait, Grant, Finlayson, Mackintosh, Murdoch (Glasgow), Blanshard, Hamilton (Dundee), Brown, Young, Roeding, Fraser (Glasgow), Murdoch (Falkirk), W. Baildon, &c. &c.

After the cloth had been removed, the Chairman gave in succession the usual loyal and constitutional toasts.

The CHAIRMAN then rose and said, he hoped those present would grant him their indulgence in the position which he now occupied, as it was only at a late hour in the afternoon that he had been requested to fill the chair, in consequence of the absence by indisposition of their respected chairman, Mr. J. F. Macfarlan. In giving what might be called the toast of the evening, he could have wished to enter into the history of the Society whose institution they were met to celebrate. At a time when there were many dissensions and differences with regard to the numerous measures of medical reform, a small number of Chemists and Druggists in London met to consider what would most conduce to the prosperity of that section of the profession to which they belonged; and from this beginning arose the Pharmaceutical Society which now occupied so prominent a place, and which was so well represented there that evening. In the first volume of the Pharmaceutical Transactions the objects of this Society were explained. These were, to excite an interest in matters connected with pharmacy, and to promote the cultivation of pharmaceutical science and the education of pharmaceutists. Besides this, it was intended in the formation of this Society to create an acquaintance, harmony, co-operation, and goodwill between the members of the profession of pharmacy in this country. The Society had in the earlier part of the day been deliberating as to matters involving the progress of pharmacy; and now they had a very excellent opportunity of fulfilling the other object which the Society had in view, namely, that of cultivating a good understanding and friendship among its different members. In reference to pharmaceutical education he would only say that, to his mind, it was a subject of the very deepest importance, and he was glad to see that of this the Society seemed perfectly sensible. Those who had been long engaged in the practice of the profession were quite aware

that something was needed to make the profession of pharmacy what it ought to be, and that those who were to succeed them should have access to means of information which they themselves never possessed; and looking upon this as one of the chief aims of the Society, he was sure they would all unite with him in wishing it every prosperity; and that the toast would not lose any of its value from the fact that another of the objects of the Society was the cultivation of a good understanding between the different members of the pharmaceutical profession. In conclusion, he hoped the Society would continue to go on without any unworthy rivalry or feeling of jealousy existing on the part of any of the Members. But before he proposed the toast, he would beg to caution the members against having immoderate expectations of the effects which the establishment of the Society would produce on the profession. It would be unreasonable to expect that the educational benefits which they would reap would be immediate. The Society was not an *annual* plant which would bring its fruit to maturity in a year; but it was a *perennial*, and would grow to the strength of a mighty tree—they must not be in a hurry—the benefits would come in good time. Without further preface, he would ask them to drain a bumper to the welfare and prosperity of the Pharmaceutical Society of Great Britain.

Mr. JACOB BELL then proposed "The University of Edinburgh, and Professor Christison." It was a very important institution to which they were now wishing prosperity, and the more so as it was the fountain from which their apprentices were to draw their supplies of knowledge which were to fit them for becoming Members of the Society. Mr. Bell then briefly alluded to the great services rendered to Materia Medica, and to science in general, by Professor Christison, but more especially to his valuable researches and discoveries in connexion with poisons, which placed him at the head of the toxicologists of this country. On this account he (Mr. Bell) had much pleasure in coupling the learned Professor's name with the University of Edinburgh, and asking them to drink success to both.

Professor CHRISTISON replied. After thanking the meeting for the honour they had done him in coupling his name with the University of Edinburgh, he proceeded to show the connexion which subsisted between the University and the objects which the Pharmaceutical Society had in view. He then took a rapid review of the discoveries which were made, subsequent to 1772, in Materia Medica, and the kindred sciences, by Drs. Black, Hope, Cullen, and Hamilton, and alluded specially to the more recent discovery of the anæsthetic properties of chloroform by Dr. Simpson, and the medicinal virtues of iodine, by Dr. Coindet—a gentleman who was educated at the University of Edinburgh.

Mr. ROBERTSON then proposed "The College of Physicians and their President." He alluded in terms of unqualified praise to the talents of their present President, a proof of which was given in the part he took in editing the *Encyclopædia Britannica*. He could not also forbear mentioning the name of their former President—a man whose fame was European, and who had lately been so highly honoured by the French Academy. He had no hesitation in saying that the discovery of chloroform by Professor Simpson was one of the greatest boons which had been given to suffering humanity, and one which would carry down the name of Simpson to generations yet unborn, as one of the greatest benefactors of the human race.

Professor TRAILL replied. He considered himself highly honoured in having his health drank by such a respectable assembly, and also in being coupled with the College over which he had the honour to preside. In reference to the object of the meeting, he might say that he considered the union which had now been consummated between the English and Scotch branches of the Pharmaceutical Society, would be of the greatest advantage to the profession, and he had no doubt it would do a great deal to improve every branch of the healing art.

The CROUPIER then proposed "The College of Surgeons and their President," to which Dr. Combe briefly replied.

Mr. MACKAY then proposed the health of Mr. Jacob Bell, and in doing so, traced the origin and progress of the Pharmacy Bill, and alluded in special terms to the exertions which Mr. Bell had made, and still continued to make, in promoting that and every measure having for its object the improvement of the profession of which he was a member.

Mr. BELL, in his reply, adverted to the circumstances which had obliged the Chemists to unite, and compared their position then and at the present time. It was not now as it was fifty years ago, when all that the Chemists had to do was to mix a

few simples. They had now to handle and mix such substances as morphia, strychnia, aconitina, and the like; and it therefore was incumbent on them, as well for their own sakes as for the safety of the public, to be acquainted with practical chemistry, and, if possible, to keep before the age. Hence the necessity for such a Society; and hence, also, the importance of bringing the Pharmacy Act into practical operation as soon as possible by obtaining a large accession of Members. If every respectable Chemist in the kingdom were at once to be identified with the Society, and adopt the title Pharmaceutical Chemist, the Act would take its full effect from that moment. The profession and the public would know that the title conferred by the Act was a guarantee of respectability, and it would speedily become a test of qualification, as all future Pharmaceutical Chemists would be obliged to join the Society, which they could only do by passing the examination. The Act had been in operation for some years in England, and their friends in Scotland having now come forward, the Chemists of North and South Britain would be united and organized as members of one national Society, which would secure unity of action, uniformity of qualification, and concentration of influence. The members of the medical profession would do well to follow the example, throw aside their local jealousies and prejudices, establish a national Pharmacopœia, and devote their energies to the advancement of science and the promotion of uniformity of education. He (Mr. Bell) would not consider their work accomplished until the practical results of the course which they had been quietly pursuing for many years had become so manifest as to pave the way for a similar movement in the higher branches of the profession; and thus the exertions of the Chemists, who had formerly been looked down upon as uneducated tradesmen, would not terminate with the establishment of their own character, but would confer indirectly a permanent benefit on the public. The Pharmacy Act had not been passed without much labour, seven or eight editions of the draft of a Bill had been printed for private circulation before it had been found practicable to introduce a Bill into Parliament, and it was not until every effort to induce any Member of the House of Commons to undertake it had failed, that he came to the conclusion that he must take steps to bring it in himself. He had encountered opposition from some members of the medical profession, but he gave his opponents credit for conscientious motives in the course they had felt it their duty to adopt, and he was glad to find that the alterations made in the Bill and further information as to the intentions of its promoters, had removed the objections previously existing. Dr. Watson, of Glasgow, had publicly announced his approbation of the Act in the form in which it was passed, and his desire to promote its objects. He was glad to see among the present company a gentleman who had been a determined but honest opponent, and who, he trusted, on finding that his objections had been met and that his apprehensions were unfounded, would become an equally determined and honest advocate of the Pharmaceutical Society. He had much pleasure in proposing the health of Dr. Gairdner.

Dr. Gairdner replied. He did not at all expect to have to reply to such a toast, but he expressed his gratification at being present on that occasion, and was glad to observe that a distinction was made between opposition on public grounds, and opposition from personal feelings, and that the Pharmaceutical Society was above the influence of the latter. It was true that he had felt it to be his duty to oppose the Bill, and his principal reason for so doing was that he was afraid the Legislature were about to commit another blunder similar to what they had already done by their legislation for the medical profession. His objections, however, had been met, and the Bill having been altered in such a way as to satisfy those more immediately concerned, and having been recognized as a part of the legislation of the country, he had much pleasure in withdrawing his objections, and he wished the Society success in its endeavours to raise the qualifications of its Members. It was due to Mr. Bell to state, that although on the occasion on which he had himself been in the position of Examinee, he had found him to be a most stringent and searching Examiner, yet he could bear testimony to his courtesy during the examination, and in other communications with his opponents. He advised the Examiners appointed by the Society to conduct their examinations with similar courtesy and good temper, as they would find this greatly to facilitate their endeavours to elicit satisfactory answers from the parties under examination. He wished them success in their laudable exertions, and concluded with a cordial approval of the objects contemplated by the Pharmaceutical Society.

Professor Christison then gave "The President, Vice-President, and Council of the Society in London."

Mr. Aitken proposed "The Honorary Members of the Scottish Branch of the Pharmaceutical Society."

The Chairman returned thanks on behalf of himself, and on the part of Professor Christison, who had just left the room, and Dr. George Wilson, for whose unavoidable absence he apologised.

Mr. Flockhart proposed "The Strangers Present;" which was replied to by Dr. Gairdner.

Mr. Shaw then proposed "The Board of Examiners and Committee in Edinburgh," which was responded to by Mr. John Duncan.

Mr. J. R. Raimes proposed "The Members from a distance," to which Mr. Hart, of Glasgow, returned thanks.

Mr. Bell proposed the Chairman, to which Dr. Maclagan replied, and proposed the health of Mr. J. F. Macfarlane.

Mr. Ainslie proposed "The Croupier," to which Mr. Baildon returned thanks.

The Chairman then proposed "The health of Mr. Mackay, the Secretary;" which concluded the list of toasts, and after a few songs and speeches, in the course of which the intention to meet again next year was expressed and warmly responded to, the company separated at rather a late hour.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE STATE OF PHARMACY IN GERMANY AND PRUSSIA.

BY M. BUSSY.

Among the modifications of the law relating to pharmacy, which have been sought for in a petition addressed to the French government by a great number of pharmaceutists, there is one of especial importance, to which all the others are in some sort subordinate. This is the limitation of the number of Pharmacies and the establishment of a legal tariff for the sale of medicines.

The consideration of this petition was entrusted by M. Dumas, then minister of agriculture and commerce, to a commission consisting of MM. Soubeiran, Boudet, and Bussy, the latter of whom, in order justly to appreciate the advantages and inconvenience of the system desired, has undertaken the examination of its practical working in the several German states where it has existed from time immemorial. On account of the interest of the question which has thus been raised, he has published the result of his inquiry and the opinions he has formed of the different systems which now obtain in France and Germany.

The medical institutions of Germany are for the most part modelled after those of Prussia. In the free towns and small states which do not possess a special Pharmacopœia, that of Prussia is invariably adopted.

This circumstance is owing not merely to the greater territorial importance of Prussia and its political influence over the smaller states, but is in a great measure the result of the especial care which that power bestows upon every subject connected with the public health.

It will, therefore, be convenient to give particular attention to the institutions of that country, the administration and political organization of which, in many respects, closely resemble that of France.

Medical legislation in Prussia is centralized under the management of a single minister, whose supervision extends not only to Medical and Pharmaceutical affairs, but likewise to everything connected with the exercise of these professions, midwives, dentists, veterinarians, and all that relates to public medical institutions. He has under his immediate authority a superior medical council at Berlin, and in each province a government medical adviser charged with the administration of all medical affairs.

Besides the government medical advisers there are other functionaries, who, under the title of "physicus" and "kreis-physicus," are charged with the surveillance of medical affairs in towns and districts, and all the details relative to the execution of the special laws and regulations of the medical professions. Questions of a purely scientific nature are submitted at Berlin to a kind of medical board,

appointed by the minister. In this board all the medical sciences are represented, and it is presided over by a superior medical functionary.

Similar boards, under the name of medical colleges, are located in the principal towns of each province in the kingdom. The members of these colleges are charged with the examination of surgeons, sanitary officers, and midwives. They are, moreover, called upon to give their advice in all difficult cases of medical and chemical jurisprudence, as well as in all instances where the local authorities consider it necessary to have recourse to their guidance. The higher administrative body is thus made perfectly familiar with all the facts which it is necessary they should be acquainted with, and upon which they may be called upon to give a decision. It will readily be understood how much this system of centralization tends to facilitate the better co-ordination of medical services by the administration, and what a much greater power it gives them of introducing such modifications or improvements as may be considered necessary or practicable. Such then is the general character of the medical organization in Prussia; and it will now be necessary to see in what manner the practical application of the system is carried out with regard to matters particularly connected with pharmacy.

CONDITIONS OF THE EXERCISE OF PHARMACY IN PRUSSIA.

In Prussia and in the several German states it is necessary, in order to exercise the profession of a pharmaceutist, to possess the following qualifications:

1. An adequate education proved by preliminary studies and special examinations.
2. An authority to open a shop, or to undertake the management of one already established.

STUDIES AND RECEPTION OF PHARMACEUTICAL CANDIDATES.

A young man who is desirous of entering a pharmacy for the purpose of learning the business must be at least fourteen years of age. He must have a sufficient knowledge of Latin to be able to translate the Pharmacopœia at sight; and further, he must be acquainted with the first elements of the physical and natural sciences. He shows that he is possessed of these qualifications by an examination, which is made by the "physicus" of the district. The "physicus" gives the candidate, who passes, a certificate stating that he has conformed to the usual regulations; he is then considered capable of entering a pharmacy, and receives from the certificate the authority to do so. The prescribed period of study as an élève is four years; but this period may be shortened six months by special permission from the pharmaceutist, when the élève has distinguished himself by aptitude and industry. At the end of this time he undergoes another examination by the "physicus" and the pharmaceutist with whom he has studied. On passing this examination he receives a second certificate, stating that he possesses the requisite knowledge and is capable of being employed as a "commis." Before he can present himself for examination to be admitted as a pharmaceutist, he must have served during five years as "commis." The system of education of élèves in Germany differs therefore in some respects from that which is adopted in France. The preliminary examination which they undergo by the "physicus" is very advantageously replaced in France by the diploma of "bachelier ès sciences," required of pharmaceutical élèves.

However, while the French law recognizes only one class of pharmaceutical students, the Prussian law wisely makes a distinction of two classes—the one comprising those who are passing through what is elsewhere called the apprenticeship, and the other including the "commis," who, properly speaking, correspond to the "élèves en pharmacie" in France.

Upon this distinction, which is extremely appropriate, depends in a far greater measure than might be supposed, the good management of the business; it involves a difference in the respective duties of the principals and the élèves, the maintenance of which is highly important. Thus a pharmaceutist may have an unlimited number of "commis," but the number of apprentices is limited, and must always be less than the former; he is bound to provide the apprentices with the necessary facilities for pursuing their studies and to assist them with his advice and instruction. It would certainly be advisable to resume in some respects this system in France; it would be advantageous to re-establish the distinction inappropriately abolished between the élève who is commencing his studies, and whose intervention in the actual business of the pharmacy may be hazardous at least when not scrupulously watched, and the

élève who has already had more than four years' practice, to whom may be entrusted a great number of operations, and, in case of necessity, even the superintendence of the business during any temporary absence of the principal.

In fact, pharmaceutists draw a marked distinction between their élèves, and although this distinction is not authorized by law, it would be very advantageous if it were.

Under the general denomination of élèves, a pharmaceutist may have only such apprentices as are entirely ignorant, and if in case of momentary absence he were to entrust the business to one of them, great inconvenience might result. It is therefore requisite that the government should establish a legal distinction between the élèves—between those who, on account of their want of experience, are unable to carry out any operations except under the immediate superintendence of the principal, and those who are sufficiently instructed to be capable of assisting, or, in case of necessity, replacing him. The latter might with justice assume the title of "aides en pharmacie," leaving to the former the denomination of élèves. Such a measure would be conformable with the true state of things, and would at the same time establish a better internal organization of pharmacies, rendering them more easy of management and of greater service to the public.

In Prussia as in France the pharmaceutical candidates are not strictly compelled to pass through a course of study at a university before presenting themselves for examination, but in both countries the necessity has been felt of altering this state of things, and making theoretical studies obligatory, long experience having demonstrated that candidates who have not passed through a regular course of study are altogether incapable of undergoing examination with any chance of success.

The Prussian law requires that the candidates shall have had nine years of practical experience, that is, four years as élève (apprentice) and five years as commis (assistant); but this term of nine years can be abridged in the case of those élèves who have attended a university course.

There are not in Germany as there are in France any special schools of pharmacy; the pharmaceutical élèves, like the students of medicine, law, and others, are educated at the universities, where they are taught in a general manner without any reference to practical applications. Such a combination of all the sciences in one institution certainly possesses very great advantages, especially for small states. They are thus enabled, by concentrating all their means upon one establishment, to provide students with the means of obtaining a general education of an elevated and far more complete character than could be done if the different educational establishments were distributed among several cities. But these universities, useful in certain respects, where law, theology, natural science, mathematics, &c., are taught, are incapable of replacing with advantage the institutions for professional instruction organized in a special manner in France under the names of the Faculty of Medicine, School of Pharmacy, School of Mines, &c., where the sciences are taught with a direct view to their applications. Taking, for the sake of example, only one science—taught in three schools of which mention has been made—chemistry, it will readily be understood that it is presented in each of them under very different points of view, and that the general course adopted for the mixed audience of a university comprizing students of pharmacy, medicine, agriculture, and mining, would not fully supply the wants of any one of these classes of students. Nevertheless it would be unjust not to acknowledge, that with regard to chemistry in particular, it is studied in Germany with very great care, and with considerable advantage to the students.

The course of study which they are required to follow at the University of Berlin, in the place of a part of their practical studies, comprizes botany, physics, chemistry, and pharmacology, natural history, and chemical analysis. The student pays the professor one or two louis for the course of each session, and in return for this he is admitted to work in the laboratory of the professors of chemistry, where he acquires a knowledge of analysis. The same regulations are observed in the other universities of Germany.

When a candidate is desirous of being received as a pharmaceutist, he addresses to the competent authority—the minister of public instruction, &c.—a request to that effect, which must be accompanied by documents proving the length of time during which he has studied. If these documents are satisfactory, the candidate receives from the minister an authorisation, in which he is reminded of the different con-

ditions with which he will have to comply. This authority having been obtained, it is addressed to the director of the university, whose business it is to convoke a board of examiners. This board is composed of eight members, who at the present time are Mitscherlich, Professor of Chemistry; Rose, Professor of Chemical Analysis; Bran, Professor of Botany; Magnus, Professor of Physics; Kluge, Professor of Zoology; Berg, Stabero, and Wittstock.

The examination is extended, stringent, and varied.

The first part, under the name of the "tentamen," is a kind of preliminary test, and relates to three subjects, mineralogy, botany, and toxicology, of which the candidate is obliged to treat in writing.

The second part consists in the preparation of a certain number of galenical substances under the superintendence of a member of the board.

The third part consists in the preparation of three chemical products, properly so called, and used in pharmacy, such, for instance, as acetic acid, iodide of potassium, and emetic tartar.

The fourth part is the chemical analysis of some mixture of mineral substances, of which the following is an example:—Oxide of mercury, oxide of zinc, oxide of magnesium, oxide of calcium, phosphate of lime.

These substances must be determined both qualitatively and quantitatively. The examiners previously fix the limits of error within which the results of the candidates must fall on pain of being rejected and having to recommence their examination.

The fifth part of the examination is likewise an analytical operation; the candidate must determine the nature and quantity of some poisonous substance mixed with a medicinal or alimentary compound. The following examples, taken from records of the board of examiners, will give an idea of the kind of analyses and the difficulties which they present:—1. Emulsion of almonds, six ozs.; corrosive sublimate, ten grs.; white oxide of antimony, ten grs. 2. Café au lait, six ozs.; arsenious acid, six grs.; sulphuret of cadmium, ten grs. 3. Protochloride of mercury, ten grs.; nitrate of silver, ten grs.; liquorice, sufficient to make 100 pills of 4 grs. each.

The recognition of drugs is the object of the sixth part of the examination; and among other things, the candidate is required to tell the names of and describe six dried plants taken at random from an herbarium containing officinal and medicinal plants.

The seventh part of the examination, and the one to which great importance is attached, is a written composition. This is a work of erudition, usually very extended, upon some given subject connected with chemistry, and capable of considerable development, as for instance the history of cyanogen. The author is allowed as much time as he may require for the completion of his treatise; books as well as all other requisites are placed at his disposal, and he is merely required to state from what source he has derived his information. He thus gives a kind of complete treatise upon the subject, and in so far is obliged to introduce into it whatever degree of learning or personal experience he may possess. He is likewise required to prefix to his treatise a *résumé* of his entire career as a student of pharmacy and science (*curriculum vitæ*), containing a statement of every circumstance which may interest in his favour either the examiners or the administration.

The treatise, strictly speaking, ought to remain in the hands of the minister, in order that it may be referred to under any circumstances which may affect the pharmaceutist who is its author. Thus, if he makes application for any privilege or other favour which it is in the power of the government to confer, this document is always consulted before a reply is made to his application; it is a "concours" which is in some sort permanent among the pharmaceutists of the country, and which places the government in a position of being always acquainted with the former merit and claims of each individual.

In the eighth stage of the examination, the above-mentioned treatise is submitted to the test of public discussion, in which the examiners take part. At the same sitting, which terminates the examination, the candidate is or may be interrogated on all branches of science connected with pharmaceutical studies. This part of the examination is public, the rest takes place in the presence only of three members of the board of examination.

When the candidate does not perfectly satisfy the examiners in any part of the above examination, he is required to present himself again after a certain time determined by the examiners; when on the contrary he is found to possess the necessary qualification, he is admitted without delay, and receives his diploma at the close of the examination.

The board at Berlin examines candidates from all parts of the kingdom; besides it, there are similar boards in the chief towns of each province, taken from the medical colleges, who likewise admit pharmaceutical candidates by examination, although only those of the second class, whose privileges are very limited.

The examination by these deputy boards is nominally the same as that at Berlin, but is really much less severe. The manipulations are conducted in the shop of one of the examiners, and never present the difficulties and importance of those required by the board at Berlin. The entire examination does not occupy more than three sittings.

The admission of pharmaceutists in Prussia, as may be inferred from the above, is an extremely serious transaction. The written treatise, which is not required in any of the examinations in France, is a very requisite and trustworthy test; the most timid candidate, however little used to speaking in public, may, by this means, furnish a certain indication of the extent of his knowledge, without his attention being distracted by any external circumstances, and leaves the examiner perfectly at liberty to be strict without fearing to be unjust, by attributing to deficient knowledge any hesitation or error which may be solely owing to momentary confusion or nervousness. The chemical and toxicological analyses are likewise tests whose introduction into the examination is indispensably necessary. The candidate may indeed have given very satisfactory answers on chemistry, but his theoretical knowledge will remain useless in the exercise of his profession—it will be of no service either to himself or to the public, unless based upon a sound practical experience. It is necessary not only that he should know processes, but likewise that he should know how to conduct them practically.

Under the pressure of this necessity of undergoing a practical examination a great number of the pharmaceutists of Germany have, by their studies in the laboratories of Giessen, Berlin, and Weisbaden, become very dexterous manipulators, who may safely be consulted by the judicial authorities in any cases of medical jurisprudence, and to whom manufacturers and agriculturists are in the constant habit of referring for scientific assistance.

THE TWO CLASSES OF PHARMACEUTISTS IN PRUSSIA.

In most of the German states there is only one class of pharmaceutists, but in Prussia there are two; those who are admitted by the examiners at Berlin, and those who are admitted by the provincial examiners. The latter correspond with regard to their modes of admission to the pharmaceutists admitted in France by the "jurys medicaux," but in Prussia they possess but very limited privileges; they are fewer in number, are not held in any estimation in a professional point of view, they cannot be consulted by the judicial authorities in cases of chemical or toxicological jurisprudence, and they are only permitted to establish themselves in neighbourhoods where the population is very small; they are, in fact, altogether in a position of marked inferiority to the other class of pharmaceutists, who are at liberty to establish themselves anywhere. The law does not strictly determine the amount of population of the towns in which pharmaceutists of the second class may establish themselves, but in practice this circumstance is not found to involve any difficulty, for the Government always gives the preference to pharmaceutists of the first class. Consequently, whenever there is a competition for the establishment of a Pharmacy, or for the management of one already existing, permission is not granted to a pharmaceutist of the second class if it is at the same time applied for by one of the first class. By this means there is never any want of qualified pharmaceutists suitable to the requirement of the population of a locality, and when it is necessary to make a choice among competitors the permission is always granted to the most worthy.

This system is by far more rational than that which prevails in France, where the pharmaceutists admitted by the jurys are at liberty to commence business in any town they please, with the exception of Paris, Montpellier, and Strasburg. The consequence is, that they establish themselves in the large towns, together with pharmaceutists of the first class, while in the smaller places there are none at all. It would certainly be very desirable if there were in France, as in all other countries, but one class of pharmaceutists, so that the poor, as well as the more wealthy

population, the inhabitants of the country places, as well as those of towns, might have their wants supplied by men of equally good education. But if, on the other hand, the inferior order of pharmaceutists are tolerated, upon the ground that such a course is to the interest of those inhabiting small towns or villages, and alone secures to them a supply of medicaments in case of necessity, it must be allowed that this object is altogether frustrated, by granting them permission to establish themselves in large towns, or in any place where the pharmaceutists of the first class would settle.

It would therefore be just, and at the same time advantageous to the country, if, as in Prussia, the preference was always given to those who can present the greatest guarantee of capacity, and if pharmaceutists of the second class were permitted to establish themselves only where the number of those of the first class was inadequate to the requirements of the population.

(To be continued.)

ON THE POWER OF SOILS TO ABSORB MANURE.

BY J. THOMAS WAY, ESQ.,
Consulting Chemist to the Royal Agricultural Society.

[RESULTS of considerable practical importance have been obtained by Mr. Way, in the investigation of the influence of certain parts of the soil in separating saline and other matters from their solution in water, and in absorbing and fixing the valuable constituents of manure, so as to present them in an available form to the roots of plants. These results have been communicated at different times to the Royal Agricultural Society, and a summary of them is contained in the following statement, which has been published in the Journal of that Society. —ED. PHARM. JOURNAL.]

In the first place, then, it was found that ordinary soils possessed the power of separating from solution in water the different earthy and alkaline substances presented to them in manure; thus, when solutions of salts of ammonia, of potash, magnesia, &c., were made to filter slowly through a bed of dry soil, five or six inches deep, arranged in a flower-pot or other suitable vessel, it was observed that the liquid which first ran through no longer contained any of the ammonia or other salt employed. The solution might have been at the commencement of the experiment sufficiently strong to make the detection of the ammonia or the potash, by the proper tests, a matter of great ease, but after filtration through the soil it was no longer to be found; in point of fact the soil had, in some form or other, retained the alkaline substance, whilst the water in which it had previously been dissolved was passing through.

But further, this power of the soil was found not to extend to the whole salt of ammonia or potash, but only to the alkali itself. If, for instance, sulphate of ammonia were the compound used in the experiments, the ammonia would be removed from solution, but the filtered liquid would contain sulphuric acid in abundance—not in the free or uncombined form, but united to lime; instead of sulphate of ammonia we should find, after the experiment, sulphate of lime in the solution; and this result was obtained whatever the acid of the salt experimented on might be. When the sulphates of ammonia, potash, magnesia, &c., were employed, the filtered liquid contained sulphate of lime; when muriates or nitrates of these alkalies were operated upon, muriate or nitrate of lime was found in the place of the former salts. It may be mentioned, also, in this place, that, at a later period of the investigation, it was satisfactorily proved that the quantity of lime acquired by the solution corresponded exactly to that of ammonia removed from it—the action was therefore a true chemical decomposition. These experiments were varied in many different ways with results of more or less interest. It was found that the process of filtration was by no means necessary; by the mere mixing of an alkaline solution with a proper quantity of soil, as by shaking them together in a bottle and allowing the soil to subside, the same result was obtained; the action, therefore, was in no way referable to any physical law brought into operation by the process of filtration.

Again, it was found that the combination between the soil and the alkaline substance was rapid, if not instantaneous, partaking, therefore, of the nature of the ordinary union between an acid and alkali. In the course of these experiments several different soils were operated upon, and it was found that all soils capable of profitable cultivation possessed the property in question in a greater or less degree. It was shown that the power to absorb alkaline substances did not exist in sand; that the organic matters of the soil had nothing to do with it; that the addition of carbonate of lime to a soil did not increase its absorptive power for these salts; and, indeed, that a soil in which carbonate of lime did not occur, might still possess in a high degree the power of removing ammonia or potash from solution, and it was evident that the active ingredient in all these cases was clay. Further trials proved that the stiffest and most tenacious clays taken from considerable depths, which had never since their deposition been exposed to atmospheric influences, and which also were absolutely free from organic matter, or carbonate of lime, that these pure clays possessed, to the fullest extent, the absorptive property. By these experiments the subject was so far narrowed that the origin of the power in question had been traced to the clay existing in all soils. It still, however, remained to be considered, whether the whole clay took an active part in these changes, or whether there existed in clay some chemical compound in small quantity to which the action was due. This question was to be decided by the extent to which clay was able to unite with ammonia or other alkaline bases; and it soon became evident that the idea of the clay as a whole being the cause of the absorptive property, was inconsistent with all the ascertained laws of chemical combination. I shall here very shortly refer to some of the experiments which were made to ascertain the quantity of ammonia and other alkalies which a given quantity of different soils would unite with and remove from solution; I should premise, however, that the same soil was found in different experiments to absorb unlike quantities of these salts, the result being principally affected by the strength of the solution employed.

1000 parts of a soil from the thin land of the Dorsetshire Downs, was found to absorb from solution of caustic ammonia—

In one experiment, 3.083 grains of ammonia; in a second experiment 3.921 grains of ammonia; in a third experiment 3.504 grains of ammonia; in a fourth experiment 3.438 grains of ammonia; these experiments being made, as just stated, with solutions of differing strength, to which alone the variations are to be referred, since two experiments made under similar conditions invariably gave corresponding results.

The same soil, when brought into contact with muriate of ammonia, instead of the caustic alkali, gave the following result:—1000 parts of soil absorbed 3.478 of ammonia, the strength of the liquid being the same as in the last experiment with caustic ammonia, with the result of which it closely agrees.

1000 grains of a light red soil, from Mr. Pusey's estate in Berkshire, absorbed—

From caustic ammonia, 1.570 grains of ammonia; from muriate of ammonia 1.966 grains of ammonia.

A sample of very tenacious white clay, from the plastic clay formation, gave the following results with solution of muriate of ammonia:—1000 grains absorbed 2.847 grains of ammonia. This clay contained no carbonate of lime, and it was accordingly mixed, in a second experiment, with some pure chalk, and digested with muriate of ammonia, as before, when 1000 grains absorbed 2.820 grains of ammonia, or a quantity identical within the limits of errors of experiments, with the previous instance, proving what was a short time ago stated, that carbonate of lime was not necessary to, and played no part in, the changes in question.

Two other experiments with this same clay, and different quantities of solution of muriate of ammonia, gave for the absorption, by 1000 grains—

In the first experiment 2.078 grains of ammonia; in the second experiment 2.010 grains of ammonia. It is sufficient to quote these experiments, to show to what extent the power of absorbing ammonia exists in different soils. I now recapitulate two experiments made with a salt of potash. 1000 grains of the same white clay, digested with different solutions of nitrate of potash, absorbed—

In one experiment 4.366 grains of potash; in a second experiment 4.980 grains of potash.

In these results it is plain that there is a decided negative to the supposition that the *whole* clay is active in absorbing the ammonia or potash. We know that chemical combinations always take place in certain definite proportions between the substances combining. Supposing, then, that the clay, as a whole, acting as a definite chemical compound, united with ammonia, we should expect it to absorb

at least two or three per 100; whereas it requires a 1000 grains of clay to remove this quantity.

I was, indeed, convinced, at a very early period of this inquiry, that the absorptive property was due to a small quantity of some definite chemical compound existing in the clay, and possibly not constituting more than four or five per cent. of its whole weight. I had every hope that, although I might not be able to separate this substance from clay—for of that there was little prospect—it might yet be possible to form it artificially from other sources at the disposal of the Chemist, and by producing a compound or compounds, having the same properties as those shown to be possessed by clay, to prove their identity with the active principles of clay itself, and thus indirectly establish its real nature. I am satisfied that this point is gained, and I now proceed to describe the nature of the result, and to give a very short history of the steps by which that result was obtained.

It will be remembered that, in the experiments described in my first paper, a salt of lime was invariably found in the resulting solution, and since many of the soils that were employed did not yield to pure water any considerable quantity of lime, and therefore did not contain any soluble salt of this base; as, further, they did not give, when treated with acids, any indication of the presence of carbonate of lime, it followed that the lime compound in the soil could not be one of the ordinary salts of lime—not, for instance, the sulphate, nitrate, or muriate, all of which are soluble in water—nor, as has been said, the carbonate.

That this active substance in the soil was really a *salt* of lime, and not the free or caustic earth itself, was also evident, from the facts, first, of want of solubility, as in the other cases; and, secondly, that the retention of the ammonia and potash by the soil could only be in the form of some insoluble salt of those alkalies, and could not have occurred without the existence of some similar salt of lime with which to interchange. What, then, was the nature of that salt? The large quantity of silica present in soils, some of which was known to exist in the form of silicates of lime, and other alkaline silicates, seemed to point to the salts of this acid as most probably the true cause of the absorptive property; but so little was, and is even now, known of the silicates, except as they are met with in the different igneous rocks, that it became necessary to institute a distinct inquiry into the nature of these compounds; and the result of that inquiry has been to extend very largely our acquaintance with them, and to show the existence of some salts of the class hitherto unknown.

It is not my intention, in this place, to enter into any detailed account of these experiments, which are necessarily of an abstract character; and I shall content myself with reporting so much of the results as may serve to show the agricultural bearings of this inquiry. When a solution of silicate of soda or potash is added to a neutral solution of a salt of lime, or to lime water itself, a gelatinous precipitate is obtained, which is silicate of lime. This compound may be washed in distilled water, in which it is very slightly soluble. Its composition varies according to the relative proportions of soda and silica in the liquid from which it is formed, but it is possible to obtain it of definite composition. The silicate of lime thus formed was digested in solutions of muriate of ammonia, but without success; it did not absorb ammonia, and is not therefore the substance to which the absorptive property of soils is due. The silicate of lime is the type of simple silicates of the same class, which would be quite unlikely to act otherwise than it did with salts of ammonia. The class of simple silicates was therefore abandoned, and attention was turned to the possibility that the absorptive property might be due to some of the compound silicates present in clay, and derived from the granitic rocks to which clay owes its origin. Fragments of such rocks are found still to be present in clay, and the most commonly known are felspar, the double silicate of alumina and potash, and albite, which is a soda felspar, or double silicate of alumina and soda. There is also a similar double silicate of alumina and lime. These different natural silicates, finely powdered, were digested in a solution of sal ammoniac, but none of them possessed the power of combining with its ammonia. It is not, therefore, to the undecomposed remains of the granitic rocks that the absorptive power of clay is to be referred. It was still possible, however, that these double silicates, when formed artificially by precipitation, might be capable of effecting that which in the mineral state they were unable to accomplish, because it is a well known fact in chemical science, that substances recently formed, and in the highly divided state resulting from precipitation, may be much more active to produce or undergo chemical change, than after they have, as in the case of the granitic rocks, been subject to the agency of heat. Accordingly, the next attempt

was to produce artificially, and without the aid of heat, salts of the same composition as felspar and albite. This was done by adding to a solution of alum a solution of silicate of soda; a gelatinous precipitate was produced, which, when washed and dried, was found to contain soda, and to be not silicate of alumina, but a compound of this latter silicate with silicate of soda. This substance, therefore, resembles albite, which has been before mentioned as a double silicate of alumina and soda.

The experiment was made as in the other cases of digesting this salt in solution of muriate of ammonia; the excess of the latter salt being washed away by successive quantities of distilled water, the precipitate was dried and examined for ammonia, which it was found to contain in very considerable quantity.

I may shortly state here, that with these double silicates of alumina and other bases the greater part, if not all, the phenomena of absorption of manures are connected; and, without detaining the reader with further accounts of the steps of the inquiry, I shall proceed to describe these salts, the method of forming them, and the changes which they undergo under different circumstances.

It is just possible that these compounds, which I believe to have a very important relation to the growth of plants, may at some future time be manufactured at a sufficiently low cost to make them available as manure; and this must be my apology for describing the mode of making them with the greatest advantage, which would otherwise be quite unnecessary.

The first step is the production of the silicate of soda. When carbonate of soda is fused at a high temperature, with sand or powdered flint, a glass is obtained, which is more or less soluble, according to the proportion of soda employed. The greater the proportion of alkali, the more soluble is the silicate produced. The formation of silicate of soda in this way is, however, very troublesome and costly, on account of the high temperature necessary, and the consequent destruction of the furnaces. A more easy and economical method of obtaining an alkaline silicate is that pursued by Messrs. Ransome and Parsons, of Ipswich, in the manufacture of their patent artificial stone. A solution of caustic soda is heated in contact with unbroken flints in large high-pressure boilers; the temperature becomes very high, and under its influence the flints in a few hours soften and melt away, the result being a strong solution of silicate of soda.

From silicate of soda formed by either of these methods, the different double silicates may be produced.

Double Silicate of Alumina and Soda.—This compound is formed whenever soluble silicate of soda is added to a solution of a salt of alumina, but the relative proportions of the ingredients in the product depend entirely upon those of the solutions used.*

The double silicate, which contains the smallest percentage of silica and therefore the highest percentage of soda, would be most important in an agricultural sense. It is best made in a state of purity as follows:—From a solution of common alum the alumina is precipitated by carbonate of soda; and after being washed with pure water, it is dissolved in caustic soda; a solution of silicate of soda containing not more than one equivalent of silica to one of the alkali, but in which any convenient excess of soda may be present, is then added to the alkaline aluminous *liquid*; the resulting precipitate is the double silicate required. It may be washed with pure water till all the caustic soda is removed, and dried at the temperature of boiling water. As thus prepared, it is a fine white powder containing water of combination, but in the following composition I have excluded the water, which is about twelve per cent., and calculated the proportions on the anhydrous salt.

It contains in 100 parts:—

Silica	52.41
Alumina	29.68
Soda	17.91
	100.00

* There appear to be at least three definite silicates of soda in which the silica is to the soda in the proportion of one, two, and three equivalents. I have succeeded several times in forming a solution of silicate of soda or of potash with the highest proportion of silica, but of course the smaller quantity is much more easily dissolved. If in making the double silicate, *alum* be used, three equivalents of silica must enter into the compound for each equivalent of alumina; but when made as described in the text, the lowest possible proportion of silica is the result—that is to say, one equivalent for each equivalent of base.

It is only very slightly soluble in pure water—an imperial gallon having been found to dissolve 3.36 grains of soda. Indeed with this, as with the silicates which are yet to be described, it is hardly proper to speak of the compounds as being soluble, since the salt does not dissolve as a whole, but is decomposed—silicate of soda being separated, whilst the silicate of alumina remains undissolved.

From this soda silicate the other compounds of the same class may be readily prepared.

Double Silicate of Alumina and Lime.—When the double silicate of alumina and soda is digested in excess of lime-water, or of any neutral salt of lime, an absorption of the lime takes place, soda being at the same time dissolved, and the result is, the production of the lime double silicate. It is found difficult in practice to separate the whole soda, but in several cases the substitution of lime for the former alkali has been almost complete. The composition of the double silicate of alumina and lime in 100 parts is—

Silica	53.33
Alumina	30.21
Lime	16.46
	100.00

Like the corresponding salt of soda the lime double silicate yields to water small quantities of the silicate of lime, but does not dissolve as a whole.

Double Silicate of Alumina and Potash.—This salt may either be formed directly in the same way as the double silicate of alumina and soda, by using silicate of potash instead of soda in the precipitation, or it may be obtained by digesting either of the two salts already described in sulphate or nitrate of potash, when the soda or lime is dissolved out and replaced by potash.

Its composition in 100 parts is—

Silica	47.97
Alumina	27.17
Potash	24.86
	100.00

From this salt one gallon of water was found to dissolve 2.27 grains of potash.

Double Silicate of Alumina and Ammonia.—When any of the foregoing compounds are digested in sulphate or muriate of ammonia, an absorption of the ammonia takes place whilst the alkali previously in the double silicate dissolves out. The ammonia double silicate is very conveniently formed from the double soda silicate; it is, like the other salts, a fine white powder, which theoretically should have the following composition:—

Silica	53.96
Alumina	30.57
Ammonia*	15.47
	100.00

It should, however, be stated, that this theoretical composition has not yet been attained. Very many different quantities of the ammonia silicate have been prepared, but the proportion of ammonia has fallen much short of that mentioned above, after due allowance has been made for the water of combination, which always reduces the proportion of the different ingredients.

The following numbers give the per centage of ammonia (NH_3) in different samples as actually prepared:—

First sample	4.51
Second sample	5.64
Third sample	5.92

The double silicate of alumina and ammonia is only very slightly soluble in water, as the following experiments will show:—

26.64 grains of double silicate were digested in 16,000 grains of distilled water—the filtered solution gave 0.2195 grains of ammonia, or 0.96 grains to the gallon.

* The chemical reader will understand that by *ammonia* here is meant the oxide of ammonium (NH_4O); the per centage proportion of *ammonia* (NH_3) will be considerably less—namely, 10.01.

29.89 grains of double silicate were digested in 16,000 grains of distilled water—the filtered liquid contained 0.265 grains of ammonia, or 1.160 grains to the imperial gallon.

This is a very small degree of solubility, as will be seen when it is remembered that carbonate of lime, which is considered an insoluble substance, dissolves in water (free from carbonic acid) to the extent of two grains in the imperial gallon. The double silicate of alumina and ammonia loses ammonia at a temperature considerably under the boiling point of water, and it is entirely deprived of it by a red heat.

The double magnesian silicate resembles those already described, but has not yet been fully examined.

I have avoided giving any detailed technical account of these salts, and have only mentioned those particulars in their history which bear upon the agricultural question. It is necessary, however, to notice some points in relation to them as a class. In the first place, it will have been observed that there is a regular order of decomposition between the silicates of each base and ordinary salts of other bases: thus the soda silicate is decomposed by salts of either lime, potash, or ammonia; the potash silicate again is decomposed in its turn by lime or ammonia; and, lastly, the lime compound by ammonia. The different bases may be arranged in the order in which they replace each other from the silicate as follows:—

Soda Potash Lime Magnesia Ammonia;

that is to say, that from a silicate of alumina and any one of these bases the base will be dislodged by a salt of any of those before it in the list. Nitrate of potash, for instance, will turn out soda from its silicate, and a potash silicate will be formed; whilst ammonia will replace any of the other bases. Of course the reverse of this action cannot occur, and therefore the double silicate of alumina and ammonia cannot be decomposed by any neutral salt of the other alkalies.

I may mention here a circumstance, which at the time appeared very curious, but is now readily accounted for. In the early investigation on filtration of manures, an experiment was made of passing flax-water through a bed of white clay. As usual, a great absorption of the different bases occurred, but the result differed somewhat from those which had preceded it. I give the account of it as it was reported in my first paper (vol. xi., p. 369):—"It will be observed that the quantities of lime and sulphuric acid in the resulting, are (within errors of experiment) the same as in the original, liquid. The quantity of chlorine is also as nearly as possible the same in both liquids, but in the original flax-water part of it was in combination with potassium, which, after treatment with clay, has been replaced by sodium. We have here two results which were unexpected—the first, that the quantity of lime should not be increased, which seems opposed to the principle before laid down, that lime replaces in the liquid the potash and magnesia previously combined with sulphuric and muriatic acids;—the second peculiarity is the existence in the resulting solution of much more soda than existed in the flax-water itself. This soda can only have been derived from the clay, which we find from the analysis contains this alkali in considerable quantity. It would seem, therefore, that in the present instance soda, and not lime, had acted the part of the substituting base. It is useless at this stage of the investigation to attempt to reconcile these apparent inconsistencies."

These apparent inconsistencies can, however, now be satisfactorily reconciled; for it is plain that wherever a sufficient quantity of any base high in the above list exists in a soil, the substitution will be confined principally or entirely to it—the white clay in question contained a large quantity of soda silicate, which necessarily took an active part in the absorption of the ingredients of the flax-water.

Nothing indeed could more clearly prove the advantage of the course which has been pursued, namely, that of instituting an examination of these compounds in the abstract form rather than confining the inquiry to the soils themselves. Incidentally also we find in this circumstance a very strong ground of belief that the substances now formed and studied *out* of the soil are really those that *in* it are the active cause of the absorptive property, since the results so closely correspond with what they should be, according to the explanation proposed.

(To be continued.)

ON THE FERMENTATION OF CITRIC ACID.

BY J. PERSONNE.

The makers of citric acid have long been acquainted with the fact, that the impure citrate of lime cannot be kept for any time without undergoing total decomposition. It has likewise been observed, that carbonic acid is one of the products of this decomposition, and remains combined with the lime, but beyond this nothing was known of its nature. The author has investigated this subject, and finds that the change is a true fermentation, consisting in the partition of the citric acid into acetic, butyric, and carbonic acids.

When clear lemon-juice is saturated with lime in a vessel to which a gas discharge-tube can be adapted, and kept at a temperature between 86° and 95° Fah., an evolution of gas commences at the end of forty-eight hours, and continues until the citrate of lime is completely decomposed. The unstrained juice is decomposed more rapidly. Pure citric acid is decomposed still more rapidly when mixed with citrate of lime and yeast.

The liquor in which the decomposition of the citric acid takes place gradually assumes the odour peculiar to the butyric fermentation, and disengages a mixture of carbonic acid and hydrogen, the relative proportion of these gases varying throughout the process.

The acids contained in the soluble lime salts obtained by evaporation and combined with oxide of silver, proved to be butyric and acetic acid; the silver salts yielding respectively 56.13 and 62.75, 62.60, 62.86 per cent. of silver. The calculated percentages of silver for these salts are 54 and 64.

The author separated the acids by fractional distillation, and at the same time endeavoured to ascertain whether the butyroacetic acid, assumed by Nickles to be a product of the fermentation of tartaric acid; was formed. The acids were combined with soda, and again separated by phosphoric acid, after which they furnished silver salts, with percentages of silver corresponding with theory. He therefore considers the decomposition to be as follows:

$$4\,(C_{12}\,H_5\,O_{11}\,3\,HO)+4\,HO=3\,(C_4\,H_4\,O_4)+2\,(C_6\,H_6\,O_6)+20\,CO_2+H_8)$$

It is possible that lactic acid is formed in the first instance, for:

$$4\,(C_{12}\,H_5\,O_{11}\,3\,HO)+4\,HO=3\,(C_6\,H_6\,O_6)+4\,(C_6\,H_4\,O_4+12\,CO_2)$$

and is afterwards decomposed, yielding butyric acid, carbonic acid, and hydrogen,

$$4\,(C_6\,H_4\,O_4)=2\,(C_8H_4O_4)+8\,CO_2+H_8.$$

—*Comptes Rendus*, from *Chem. Gaz.* March 15.

ON THE PRESENCE OF BORACIC ACID IN THE MINERAL WATERS OF WIESBADEN AND AIX-LA-CHAPELLE.

BY MM. FRESENIUS AND WILDENSTEIN.

M. Henry Rose has recently made known a new process for the detection of boracic acid. It consists in acidulating with hydrochloric acid the liquor suspected of containing a borate, and then testing it with turmeric paper, which is to be afterwards dried. When the liquor contains even but a millioneth part of boracic acid, the paper assumes a brown colour.

M. Fresenius has applied this process for the detection of boracic acid in the water of Wiesbaden. Fifteen kilogrammes of this water were mixed with a solution of carbonate of soda, until a strong alkaline reaction was observed, and then evaporated down to about a thirtieth part of their primitive volume. The liquor, filtered whilst warm, was almost neutralized by hydrochloric acid and again evaporated to about a fourth of its volume. By filtering the concentrated and boiling solution, the sea-salt present in it, which had crystallized, was separated; but as the solution contained a small quantity of copper, it was acidulated by hydrochloric acid, and sulphuretted hydrogen passed into it. After filtration this liquor already gave a light reddish-brown colour to turmeric paper; and in order to obtain a more evident reaction, it was super-saturated with carbonate of soda, and again evaporated until reduced to ten grammes. The last mother-liquor, when acidulated by hydrochloric acid, gave to turmeric paper the characteristic reddish-brown tint of boracic acid. Two-thirds of this solution having been evaporated to dryness and the residue treated with alcohol, it was observed that, at the moment this alcohol was ignited, the edges of the flame assumed a green tint. This tint was not perceptible but at the moment of ignition. M. Fresenius assured himself of the absence of boracic acid in the reagents employed by him.

In applying this process to the waters of Aix-la-Chapelle, M. Wildenstein also detected a small quantity of boracic acid.—*Journal de Pharmacie.*

ON THE PRESENCE OF BORACIC ACID IN THE MOTHER-LIQUORS OF THE SALT WORKS OF BEX.

BY M. S. RAUP.

The method hitherto employed for the detection of boracic acid either in a free or combined state, consists in mixing or dissolving in alcohol the salt or liquid to be tested, which is previously rendered acid, and then igniting it: the peculiar greenish tint assumed by the flame denotes the presence of boracic acid.

But this method is inefficient when the quantity of boracic acid is minute. I employed it in testing the mother-liquors of the salt works of Bex, in which I suspected its existence, on account of the nature of the soil washed by these salt waters. The flame did not present at any period of its combustion, nor by agitation of the mixture, the slightest appearance of a greenish tint.

Of all the acids, boracic acid is the only one which reddens yellow turmeric paper, in the same manner as free alkalies, for which turmeric is the reagent most commonly employed. Professor H. Rose has noticed this property, and indicated turmeric paper as the most certain test for boracic acid; I have satisfied myself that it fully answers its intended purpose. The reaction of boracic acid on the yellow colouring matter of turmeric paper is not produced by simple immersion of the paper in a solution of boracic acid, even at a boiling temperature, it is only on drying the paper at a certain heat that the red colour becomes manifest.

I made use of this reagent in testing the above-mentioned mother-liquors, which did not present the greenish colour with the alcoholic flame; I immersed some turmeric paper in the mother liquor, which was acidulated with a few drops of hydrochloric acid; the paper was then dried at the temperature of boiling water, and became red, thus indicating the presence of boracic acid.

The household salt of Bex, as also the salts which I had extracted from this mother liquor, when treated in this manner, and with the addition of the same hydrochloric acid, did not in the least change the yellow colour of the turmeric paper, but on the addition of a particle of borax the characteristic reaction took place in a marked manner.

There cannot remain any doubt of the existence of boracic acid, as a borate, in this mother-liquor, for a certain quantity of this water, placed in a glass retort, and treated with sulphuric acid, gave a slight sublimate in the neck of the retort, which proved to be boracic acid.

We might therefore add to the results of the analyses which have been made of the mother-liquors of the salt works of Bex, an undetermined quantity of borate. I do not doubt also but that boracic acid would be found, as a borate, in the water of other salt works, equally distant from volcanic soil.—*Journal de Pharmacie.*

ON THE ADULTERATION OF PERU BALSAM.

BY G. L. ULEX.

Among the substances fraudulently mixed with Peru balsam, castor oil, and copaiba balsam, are the most difficult to detect. The author recommends the following method:—Ten drops of Peru balsam are mixed in a watch-glass with twenty drops of concentrated sulphuric acid, and then diluted with water. If the balsam is pure, a brittle resin is thus obtained, but when adulterated with castor oil and similar substances, this residue is proportionately soft. Sulphurous acid is likewise disengaged, which is not the case when the adulterating substance is copaiba balsam.

Considerable variations in the specific gravity of Peru balsam must not be altogether overlooked. It usually varies between 1.14 and 1.16, and when adulterated with as much as 25 per cent. of castor oil, it is much lower.

To detect copaiba balsam, the substance is to be heated in a small tube retort, until a few drops of a yellow oily liquid have passed over, which takes place at a temperature of 374° Fahr. This distillate is acid, and soon deposits crystals of cinnamic acid. If the balsam used was pure, it solidifies completely, but when adulterated with copaiba, the crystals float in copaiba oil. The distillate is then to be saturated with caustic potash, and the solution of cinnamate removed by means of blotting-paper. The drops of oil which are then left mix quietly with iodine if the balsam was pure, but cause an immediate explosion if copaiba was present in it. —*Archiv. der Pharmacie, January*, 1853.

ADULTERATION OF TOLU BALSAM.

BY G. L. ULEX.

Pure tolu balsam heated in sulphuric acid dissolves without any disengagement of sulphurous acid, yielding a cherry-red liquid. When, however, colophony, with which it is frequently adulterated, is present, the substance blackens, swells up, and disengages much sulphurous acid.—*Archiv. der Pharmacie, January*, 1853.

SEIDLITZ POWDERS.

The necessity for using two papers may be obviated, and a very satisfactory preparation obtained, by mixing two parts of bitartrate of soda with one part of bicarbonate of soda. The mixture keeps well even in paper, and effervesces briskly when mixed with water.

MEANS OF POWDERING SPERMACETI.

O. A. Hollandt states that spermaceti may be reduced to the most impalpable powder by melting it over a gentle fire and then stirring it in a previously warmed mortar until cold.—Wittstein's *Vierteljahresschrift für practische Pharmacie.*

OFFICIAL RETURN OF THE QUANTITIES OF VARIOUS DRUGS, &c. IMPORTED IN THE YEAR ENDING JANUARY 5, 1853.

Ashes, pot and pearl, imported, 151,944 cwts; barilla and alkali, 1,984 tons; brimstone, 758,718 cwts.; caoutchouc, 19,607 cwts.; cochineal, 22,328 cwts.; indigo, 83,565 cwts.; lac dye, 17,612 cwts.; logwood, 19,669 tons; madder, 84,385 cwts.; madder root, 179,813 cwts.; shumac, 9,758 tons; Terra Japonica, 3,244 tons; cutch, 2,236 tons; valonia, 13,870 tons; guano, 129,889 tons; lard, 63,340 cwts; train, blubber, and spermaceti oils, 19,906 tons; palm oil, 523,231 cwts.; cocoa-nut oil, 101,863 cwts.; olive oil, 8,898 tons; quicksilver, 2,113,186 lbs.; saltpetre and nitrate of soda, 561,137 cwts.; common turpentine, 481,616 cwts.

Of some of these foreign productions, the quantities re-exported are given in the returns, viz.:—Cochineal, 8,964 cwts; indigo, 67,184 cwts.; lac dye, 6,935 cwts.; logwood, 2,225 tons; Terra Japonica, 241 tons; cutch, 328 tons; guano, 36,247 tons; palm oil, 111,654 cwts.; cocoa-nut oil, 74,751 cwts.; olive oil, 698 tons; quicksilver, 783,401 lbs.

As all the articles above enumerated are admitted into this country duty free, no return is made of the quantities of each actually applied to home consumption.

Opium imported, 205,780 lbs.; exported, 102,217 lbs.; retained for home consumption, 62,521 lbs.; cassia lignea imported, 496,833 lbs.; exported, 344,077 lbs.; retained for home consumption, 109,029 lbs.; cinnamon imported, 541,883 lbs.; exported, 490,664 lbs.; retained for home consumption, 36,354 lbs.; cloves imported, 313,949 lbs.; exported, 200,188 lbs.; retained for home consumption, 175,287 lbs.; mace imported, 61,660 lbs.; exported, 43,992 lbs.; retained for home consumption, 21,448 lbs.; nutmegs imported, 357,939 lbs.; exported, 143,003 lbs.; retained for home consumption, 239,200 lbs.; pepper imported, 6,641,699 lbs.; exported, 1,512,366 lbs.; retained for home consumption, 3,524,501 lbs.; pimento imported, 22,708 cwts.; exported, 16,995 cwts.; retained for home consumption, 3,872 cwts.

In the list of articles of British produce exported, we find the following returns made:—Soda, 980,056 cwts.; declared value, £395,527; linseed, hempseed, and rapeseed oils, 3,776,391 gallons; declared value, £419,212; painters' colours and materials, declared value, £249,026; salt, 19,863,956 bushels; declared value, £223,923.

IMPROVEMENTS IN THE MANUFACTURE OF TIN.

(*Michell's patent, enrolled March* 18.)

In this process, the ores of tin, which have previously been passed through the stamping mill and washed, are mixed with common salt, and the mixture exposed to the temperature of 163° of Daniell's pyrometer in a reverberatory furnace. The result of this heating is, that the chlorine of the salt combines with the other metals present, so as to render them soluble in water. The purified tin ore, thus obtained, is then washed and smelted in the usual way. A previous analysis of the rough tin ores is necessary, in order to fix the proportion of common salt to be employed; care is also required to be used in the regulation of the temperature of the furnace, so as not to decompose the oxide of tin.

IMPROVEMENTS IN PREPARING OILS FOR LUBRICATING AND BURNING.

(*Hutchison's patent, enrolled March* 18.)

The object of this process is, to impart additional fluidity to lard or tallow oil, and viscid oils generally, by combining them with oleic ether, and thus giving the oils more of the character possessed by spermaceti oil, and rendered better adapted for burning and lubricating. For this purpose one part of oleic ether is mixed with two parts of neutral tallow oil.

To obtain oleic ether, the patentee proposes to adopt the well-known continuous process of making sulphuric ether, substituting, of course, oleic acid for sulphuric. The oleic ether is washed with an alkaline solution previous to use. Wood spirit may be employed in the manufacture of oleic ether instead of spirit of wine.

PURIFICATION OF OLEIC ACID, AND APPLICATION TO MANUFACTURING PURPOSES.

(*Wilson's Patent, enrolled March* 18.)

In the manufacture of Price's stearic candles from palm oil or tallow, a large quantity of oleic acid results, which has not hitherto come into much demand, on account of its unpleasant odour. The removal of this objectionable smell, which arises from the presence of a volatile matter in the oleic acid, is effected in Mr. Wilson's process, by submitting the acid to the action of steam, heated to 400° Fah., for about two hours, and then gradually introducing cold water to cool it down. The oleic acid thus purified, is now fit for use in place of oil.

The application of this purified oleic acid to manufacturing purposes, consists in combining it with a solution of soda-ash, rendered caustic by means of quicklime, in the proportion of one pound of soda-ash to a gallon of water, and adding thereto a pint of oleic acid, well stirring the mixture to effect a complete combination of the ingredients. This saponaceous compound may be employed in milling and fulling woollen cloth, and in washing wool.

A STUDENT'S SKETCH OF ORFILA.

BY MR. JOSEPH INCE.

At a time when the Pharmaceutical Society is endeavouring to mark its permanent respect for one who was so long its greatest ornament, Pereira, I think it but right that we should not be too exclusively national, but be willing to bestow a few moments on a great continental rival, equally associated with the progress of science abroad, and long time its ablest exponent, Orfila. Every one knows that Paris contains a world within itself, the Students, and that their abode is called the Quartier Latin, a place with its society, habits, and pursuits as distinct as the gipsies; and that there is an essential difference in education between us and the French, for, while we have Oxford and Cambridge apart from London, they have but one centre, the metropolis, and that the different colleges, namely, of Theology, Arts, General Literature, or Medicine, are all together, in one narrow circle, close to Notre Dame. It is with the College of Medicine only that we have to do; and here in the great quadrangle, in the depth of winter, an immense body of students are seen to assemble at nine o'clock round the two entrances. Chemistry has one great adversary here, the weather; the snow falls in clouds and the cold is intense, but nothing can give an idea of the ardour with which all studies are conducted. The student fears

no storm, and has not got the money for an umbrella; and I have often seen the mass outside waiting under circumstances that would frighten any Englishman for the opening of the doors. There was one monotonous phrase with which this was always accompanied, "Quand vous voudrez." Within five minutes from the time every seat in the vast theatre was filled, and silence was instantaneous on the entrance of Orfila. In person he was extremely handsome, and his voice naturally so good, that at this very time he was so great an acquisition in private circles, as to render the report more than credible that he had been originally destined for the opera.

But while Dumas always prided himself on his extreme correctness, so that not one phrase in his lecture was not accurately correct, and no experiment ever failed owing to the whole having been carefully rehearsed beforehand, Orfila's great aim was address, and his power of commanding the attention of his audience. His wit was not only natural but studied and intentional, and though Frenchmen are not generally deficient in relating an anecdote, Orfila, though a Spaniard, in this was never excelled. He was the *beau ideal* of the popular man.

It may not be uninteresting to know the exact plan on which the lectures on Chemistry were delivered, especially as that at the School of Medicine was the only one of the sort; for although there was a course on the same subjects by Dumas, at the Sorbonne, it was of a far more elaborate nature, and only adapted to advanced students, but I may add, that such is the rage for Chemistry at Paris, that both were invariably attended. Orfila always began by a few general considerations on cohesion, crystallization, and chemical affinity, the laws of combination, nomenclature, and equivalents, ending with a short notice on heat, light, and electricity. He then treated of the non-metallic bodies, starting with oxygen; next the different combinations that oxygen forms with the substances just mentioned, viz., the various acids, and then the salts; afterwards hydrogen, and the different combinations it forms with the same bodies, leading to the second portion, the metallic bodies. Each single subject was always treated under five heads:—1. Its history; 2. Its characteristics; 3. "Its *essential property*;" 4. Its combinations; 5. How to make it. It was the third head that he insisted every one should remember.

There was one thing which would strike any stranger on entering the theatre, namely, the immense number of illustrations on the lecture-table—they were almost endless; but all ordinary occasions were eclipsed when he came to his famous subject, *Arsenic*. Then the whole front seemed to bristle with Marsh's apparatus, from the original one to all its modifications, and the one which Orfila himself approved of; then every experiment showing additional evidence in detecting or distinguishing proofs of poison was already finished before the lecture and exhibited. So what with plates covered with spots true and false (antimony), precipitates, tabular views, and apparatus, it presented an idea rather confusing, and the chaos was not much improved by a few dead dogs conspicuous here and there poisoned on scientific principles. The great merit of this plan was certainly the distinctness with which each subject was presented. The description of the non-metallic bodies having been once completed, the history of the different compounds formed by their union with oxygen and hydrogen became perfectly simple, as well as the new combinations they could produce by their own action one on the other. It was impossible, after having followed a course of this kind, not to have the clearest theoretical knowledge of the nature and intention of Chemistry. The fault of his system was the absolute reliance placed by him, in cases of toxicology, on mere re-agents, without a due allowance for attendant circumstances; but this at least must be said, that when any biography shall be written of Orfila the summary must always be this, that to the most accurate acquaintance with his subject he united the happiest method of explaining it.

31, *Southampton Street.*

THE PEREIRA MEMORIAL,

IN CONNEXION WITH THE PHARMACEUTICAL SOCIETY.

At a Meeting of the Committee, held at 17, Bloomsbury Square, April 14th, Mr. Joseph Gifford in the chair, it was resolved:—

"That a proof impression of the portrait of Dr. Pereira, which has been executed for the Pharmaceutical Journal, be given to each subscriber of not less than 10s. 6d., and a print to each subscriber of 5s."

It was moved and seconded, pursuant to notice, "That in the opinion of the Committee the Pereira Medal should be awarded alone for discoveries and researches in Materia Medica, and not for proficiency."

In support of the motion it was argued that the medal being intended to do honour to the memory of Dr. Pereira, it should be awarded only for a high standard of merit, and for original researches. If it were given to students for proficiency, young men would grind up for it, and it would become so common as to lose its value. The objection would not be removed by having a silver and a bronze medal, as the distinction would not be generally understood.

On the other side it was urged that the honour conferred on the late Professor would be in proportion to the benefit arising from the medal as a means of promoting improved education and scientific research. If it were confined, as proposed in the resolution, its sphere of influence would be so limited that it would produce very little effect. Years might elapse without the occurrence of an occasion for awarding the medal. But, by giving a medal for proficiency, emulation would be excited among a large class of students. A bronze medal might be given annually for proficiency; and a silver or gold medal, at less frequent periods, for researches or discoveries. It was also observed that inconvenience would arise from a deviation from the conditions already agreed to and published, as it would be necessary to obtain the consent of the subscribers generally.

The resolution was put to the vote, and lost by a large majority.

BOOKS RECEIVED.

NEW YORK JOURNAL OF PHARMACY. Vol. No. 7 to 12 inclusive, and Vol. 2, No. 1. Edited by BENJAMIN W. Mc CREADY, M.D. New York: Joseph W. Harrison. 1853.

THE GLASGOW MEDICAL JOURNAL. Glasgow: Published for the Proprietors by Richard Griffin and Co. 1853.

PHYSIOLOGICAL CHEMISTRY. By Professor C. G. LEHMANN Vol. 2. Translated by GEORGE E. DAY, M.D., F.R.S., &c. London: Printed for the Cavendish Society, by Harrison and Son, St. Martin's Lane, 1853.

ATLAS OF PHYSIOLOGICAL CHEMISTRY. Consisting of Microscopic Figures. By DR. OTTO FUNKE. A Supplement to Lehmann's Physiological Chemistry. London: Printed for the Cavendish Society.

TO CORRESPONDENTS.

A Subscriber (Haddington).—We are unacquainted with the process for bleaching Gutta Percha.

Sigma (Manchester).—*Tinct. Ferri Æther.* Pris. Ph.—℞ To nine parts of* solution of acetate of iron, add one part of acetic ether, and two of rectified spirit.

* Solution of acetate of iron: ℞ Sesquioxide of iron one part, acetic acid six parts; digest for three days and filter.

Lemon Peel.—In making the compound infusions of gentian, and orange peel, the lemon peel may be used either dry or fresh.

Æsculapius (Birkenhead).—(1.) We have no specific for tooth-ache.—(2.) The quantities are given in the *Pharmacopœia*.—(3.) *Solution of muriate of morphia*—When no strength is mentioned, that of the *Pharmacopœia* should be used.—(4.) See No. vii., page 314, of the present volume.

H.W. (Bishop's Auckland).—The formulæ required are given in Beasley's *Formulary*.

Juvenis (Exeter).—Bisulphuret of mercury was formerly called *cinnabar of antimony*, from its being a residuary product in the process for making butter of antimony.

A Registered Apprentice (Shrewsbury).—*Selecta é Prescriptis*, 5*s*.

T. T. T. (Merthyr Tydvil).—Phillips's *Translation of the Pharmacopœia*.

N. E. W. (Ormskirk).—(1.) Balfour's *Manual of Botany*.—(2.) Hooper's *Medical Dictionary*.

A. B. C. (Worcester).—(1.) Christison or Taylor *On Poisons*.—(2.) Ainsworth's *Latin English Dictionary*.

A Constant Reader (Manchester).—Thomson's *Dispensatory* is well adapted for the purpose.—(2.) Royle's *Materia Medica*, 12*s*. 6*d*. Churchill.—(3.) Books from the Library of the Pharmaceutical Society, may be sent to a distance, provided the carriage is paid.—Application should be made to the Librarian, 17, Bloomsbury Square.

A Registered Apprentice (Oxford Street).—See the above. Enquire at 17, Bloomsbury Square.

H. W. (Nantwich).—The second part of Royle's *Materia Medica* is in progress, but we know not when it will be published.

T. M. O. (Ryde)—*Chemicus* (Harrowgate)—*J. W. H. R.* (Newcastle)—*M.D.* (Bath) should read the article to Apprentices and Students in our Number for January, 1853. Candidates must attend the Board of Examiners in London or Edinburgh. The days of meeting, with other particulars, may be obtained on application to the Secretary, 17, Bloomsbury Square. See also the first page of this Number, and page 261 of the Number for December last.

Omega (Spilsby).—See Vol. xii., No. 6, p. 261. An Associate coming within the definition, in the second of the two bye-laws, may be admitted as a Member, after having settled in business in any of the Colonies.

A Member (Bath) has entered into an arrangement with an apprentice upon condition of the faithful performance of his duties, to pay the fee for his attendance on a full course of practical instruction in Pharmaceutical Chemistry. This is an encouragement to industry worthy of imitation.

Hirsutus (Islington).—We are not acquainted with a better depilatory than that recommended by Mr. Redwood. The application must be renewed when requisite. It should be used with care.

M. P. S. (Derby).—We have had no experience in the use of Mackenzie's Triturator. Mercurial ointment is made on the large scale by a machine connected with a steam engine, by which means it is prepared in a shorter time than by trituration in a mortar. We are unable to state the exact time.

A Member (Birkenhead) has adverted to the proposed licence for tea, coffee, &c., to which the vendors of pepper will be subject if the proposed Budget should be carried into effect. We had the subject previously under consideration. It will most likely be brought before the notice of the Council, but at the time of going to press we are not prepared to state what steps may be decided on.

W. P. (Nailsea) will perceive that we have not omitted to notice the proposed Medical Bill.

A Reader (Blackburn).—Acetic acid cannot be separated by precipitation.

Compositæ.—Refer to any work on Materia Medica.

French (Brighton).—(1.) There is no chemical action.—(2.) See the cover of this Journal for last month.—(3.) A diploma granted by a German University.—(4.) No.—(5.) The liquid called chloric ether is a mere mixture of chloroform and spirit.

The Portrait of Dr. Pereira will be inserted in our next Number.

We beg to acknowledge the receipt of the Report of the Eastern Dispensary of Bath.

ERRATA.—Last number, page 484, *for* Edinburgh Chemists' Association *read* North British Branch of the Pharmaceutical Society. Page 503, line 7, *for* potassi *read* potassii, *for* tincture *read* tinctura.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. CHURCHILL, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

MEMORIAL TO THE LATE DR. PEREIRA,

IN CONNEXION WITH THE PHARMACEUTICAL SOCIETY.

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SECRETARY.

MR. EDMUND GREAVES,
17, Bloomsbury Square.

At a Meeting held March 21, Mr. JACOB BELL in the Chair,

Resolved,

"1. That a Subscription be commenced for the purpose of obtaining the Die of a Medal to be awarded as a Prize for researches or proficiency in Materia Medica, under such regulations as the Council of the Pharmaceutical Society may deem expedient; and that it is desirable to raise a sufficient sum to endow the Medal.

"2. That in the event of a sufficient amount being collected, a proof impression of a Portrait of Dr. Pereira be given to each Subscriber of not less than One Guinea, and an ordinary impression to each Subscriber of Half-a-Guinea."

At a Meeting held April 14, Mr. JOSEPH GIFFORD in the Chair,

Resolved,

"That a proof impression of the Portrait of Dr. Pereira, which has been executed for the Pharmaceutical Journal, be given to each Subscriber of not less than 10*s*. 6*d*., and a print to each Subscriber of 5*s*."

An impression of the Portrait may be seen at 17, Bloomsbury Square, and also at Mr. Churchill's, Princes Street, Leicester Square. On the other side is a provisional List of Subscribers; those desirous of adding their names are requested to communicate with the Treasurers or Secretary, to either of whom Subscriptions may be made payable by Post-Office Order or otherwise.

EDMUND GREAVES,
Secretary.

PHARMACEUTICAL SOCIETY,
BLOOMSBURY SQUARE,
April 14, 1853.

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PAR

PAMPHLETS

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